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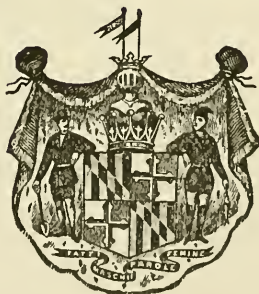
8.
SIXTH ANNUAL REPORT

OF THE

Bureau of Industrial Statistics
OF MARYLAND.

CHARLES H. MYERS, CHIEF OF BUREAU.

1897.



BALTIMORE, MD.

KING BROS., STATE PRINTERS.

1898.

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STATE OF MARYLAND,

BUREAU OF INDUSTRIAL STATISTICS,

BALTIMORE, *March 1, 1898.*

Honorable Lloyd Lowndes,

Governor of Maryland:

SIR—I have the honor to herewith submit to you the Sixth Annual Report of the Bureau of Industrial Statistics of Maryland.

Very respectfully yours,

CHARLES H. MYERS,

Chief.

INTRODUCTION.

The Sixth Annual Report of this Bureau will be found to contain a variety of subjects, vitally affecting the industrial condition of the State of Maryland and the City of Baltimore. I here desire to direct the attention of the Legislature to the defects existing in the law under which this Bureau is operating. They are an absolute insufficiency of the appropriation and the lack of authority with which to compel the divulging of such information as this Bureau is directed to publish. Experience has taught that if such departments of government are to accomplish satisfactory results, they should not be fettered in their performance. My predecessors in office frequently pointed out these needs, and my experience but emphasizes the correctness of their complaint. I most heartily recommend that such changes be made to the law governing this Bureau, as have been found necessary for the collection of reliable statistical data bearing upon the subjects, for the collection of which it was created.

Chapter 1 of this report presents an investigation into the condition of the railroads of this State, for the years 1892 and 1897. It shows the earnings and expenses, freight and passenger traffic, the number, wages and hours of labor of the employes, and the number of persons killed and injured for each of the railroads operating, in whole or in part, within the borders of Maryland.

Chapter 2 is a statement of the culture and manufacture of Maryland tobacco, showing its various stages from planting to consuming.

Chapter 3 is a description of the City of Baltimore, showing its situation, climate, trade and commerce, and the advantages it holds forth to those seeking either homes or manufacturing sites.

Chapter 4 is a discussion of the economic effects of the ground rent system of Baltimore city, especially its influence upon the laboring classes of the community and its effect upon the question of house rents.

Chapter 5 is the history of the Baltimore ship channel, extending from the Chesapeake Bay to the City of Baltimore,

upon which large sums of money have been spent by that city and the National Government.

Chapter 6 is a statement in detail of the wholesale trade of Baltimore City for the year 1897.

Chapter 7 contains a list of the agricultural, manufacturing and mechanical industries within the State of Maryland.

Chapter 8 shows the rate of wages and hours of labor of the various trades within the City of Baltimore.

Chapter 9 gives a comprehensive idea of the culture of oysters as practised in the United States, together with the opinions of oystermen and others, upon the condition of the industry within the State of Maryland.

Chapter 10 is devoted to the coal industry of Western Maryland. The present state of the industry, the condition of the miners, their wages and hours of labor, the output of the mines and other interesting and instructive information will be found in this article.

The financial statement, showing the appropriation and expenditures of this bureau, is published in compliance with the law.

CHAPTER I.

RAILROAD STATISTICS.

When the Legislature of 1892 enlarged the functions of this Bureau the object was to concentrate into one department the collection and publication of statistics concerning all the industrial enterprises of the State. It is not surprising, therefore, that among the extra duties imposed by that Act was the publication of statistics of the railroads and other transportation companies of Maryland. Following the law, the report for 1896, contained a full history of the street railway companies of Baltimore, while it has been thought desirable in this report to investigate the condition of the Maryland railroads. My predecessor published in 1892, a thorough report of the then condition of the railroads of the State, and I feel that it would be interesting to compare the figures as appear in that report with the condition of the railroads at the present time.

The only change made in the figures for 1892, as published in the first annual report of this Bureau, is for the earnings and expenses of the West Virginia Central and Pittsburg, and the Piedmont and Cumberland Railroads, which in 1892 could only be obtained for six months. These figures have been doubled in order to form a basis for comparison.

Statistics are not given separately for all of the roads of the Pennsylvania system, and for that reason the Baltimore and Potomac, and all the branches of the Maryland and Delaware division of the Philadelphia, Wilmington and Baltimore are included in the figures for that system. The Frederick and Pennsylvania road, which reported in 1892, has since been merged into the same system, and the earnings and expenses of the Frederick and Pennsylvania have this year been reported as a part of the Philadelphia, Wilmington and Baltimore. The Annapolis and Baltimore Short Line refused to make a report in 1892, but it has since reorganized under new management, who courteously furnished the information published in this chapter. The only road which made a report in 1892, and declined to furnish information this year, is the New York, Philadelphia and Norfolk.

As the operations of nearly all the roads embraced in this investigation extend beyond the State, the only way in which

it was possible to secure statistics for the State of Maryland alone, was by pro-rating on the mileage basis; that is, by crediting to the State of Maryland such part of the entire business of the road as the miles of road within the State bear to the total mileage. This is as close an approximation as it is possible to make, and is the method adopted by all the statistical bureaus under similar conditions. It is the same plan adopted in the report on this subject by the Bureau in 1892.

There are operating, in whole or in part, within the State of Maryland, twenty-four railroads. These are the Baltimore and Ohio, the Pennsylvania system, which includes the Northern Central, Baltimore and Potomac, Philadelphia, Wilmington and Baltimore, Frederick and Pennsylvania, Philadelphia and Baltimore Central, Cambridge and Seaford, Newark and Delaware City, Delaware, Maryland and Virginia, Queen Anne and Kent, Delaware and Chesapeake, (the last six being included in the Delaware division of the P., W. & B.) Annapolis, Washington and Baltimore, Baltimore and Annapolis Short Line, West Virginia Central and Pittsburg, Piedmont and Cumberland, Cumberland Valley, Baltimore and Chesapeake, New York, Philadelphia & Norfolk, Western Maryland, Cumberland and Pennsylvania, George's Creek and Cumberland, Norfolk and Western, Baltimore and Delaware Bay, Baltimore and Lehigh, Southern Maryland, and the Queen Anne's Railroad, which has recently been built from Queenstown, Maryland, to Lewes, Delaware.

The Queen Anne's Railroad has not been in operation for a full year, and consequently made no returns. The George's Creek and Cumberland Railroad, operated by the Maryland and American Coal Companies of New York, and the Cumberland and Pennsylvania Railroad, operated by the Consolidation Coal Company of Baltimore, keep no separate accounts, and consequently are not included in this report. The Southern Maryland road is a feeder of the Pennsylvania system in St. Mary's, Charles and Prince George's counties but for some years it has been in a moribund condition, and no report could be obtained from it.

In this investigation it has been discovered that no complete historical data of the railroads of Maryland has been published, except in Poor's Manual, the recognized railroad directory of the United States. I, therefore, requested the railroads to give me a brief summary of the important events in their history for publication. The answers received

are herein published, while the statements for others have been prepared from annual reports of the railroads themselves, from the court records and from Poor's Manual.

BALTIMORE AND OHIO.

This railroad, the first to operate within the State, was chartered by the Legislature of Maryland, February 28, 1827, and in Virginia March 8, 1827. Construction was not commenced until July 4, 1828. The line from Baltimore to Ellicott's Mills (now Ellicott City,) was opened up for business May 24, 1830. For three months the trains were drawn by horses, but on August 30, 1830, steam was substituted as means of locomotion. This road was opened through to Wheeling, January 1, 1863. The Washington branch was opened August 25, 1834, and the Parkersburg branch (under the name of the Northwestern Virginia Railroad,) May 1, 1857, both of which are now substantially owned by the Baltimore and Ohio Railroad Company. The line to Frederick City was opened up in 1831, the Locust Point branch was completed in 1846, the Camden cut-off in 1868. The Metropolitan branch was not completed until May 28, 1873, and the Curtis Bay branch until 1883.

The Baltimore and Ohio is distinctly a Maryland corporation. At one time the State held a large proportion of its stock, and the Legislature has been more liberal with it than with any similar corporation. The State still holds stock in the Washington branch, and has representation in its board of directors. It is the largest railroad system within the State, operating in 1897 about 2,073 miles of track, of which 296.94 miles are within the State of Maryland. On the first day of March, 1896, this company being unable to meet its liabilities, was placed in the hands of receivers. Since that time many improvements have been made on the right of way, and large sums have been spent for new rolling stock. The business has increased largely under the receivers, but they have not yet been able to pay all the obligations of the company.

PHILADELPHIA, WILMINGTON & BALTIMORE.

The Philadelphia, Wilmington and Baltimore Railroad Company was formed February 5, 1838, by a consolidation of the Philadelphia and Delaware county, and Wilmington and Susquehanna, Delaware and Maryland, and Baltimore and

Port Deposit Railroad Companies. The road was completed in July 1837. The company having become practically the owner of all the property of the Queen Anne and Kent Railroad, assumed control of that road on May 1, 1896. The lines operated are as follows: Main line and branches, the South Chester, Elkton and Middletown, Baltimore and Potomac, (including Catonsville Short Line,) and the Washington Southern Railway, comprising the Maryland division, Delaware, Queen Anne and Kent, Delaware and Chesapeake Railway, Delaware, Maryland and Virginia, and Cambridge and Seaford, comprising the Delaware division; the Philadelphia and Baltimore Central, Chester River, and the Philadelphia and Delaware Company, operated as the Central division. The length of the lines operated by this road is 669.33 miles.

NORTHERN CENTRAL.

The Northern Central Railway Company was formed December 9, 1854, by a consolidation of the Baltimore and Susquehanna, York and Maryland, York and Cumberland, and Susquehanna Railroad Companies. The main line reaches the Elmira and Williamsport Railroad, its northern extension, by using, under a traffic arrangement, forty miles of the Philadelphia and Erie Railroad, between Sunbury and Williamsport. It practically owns the Elmira and Lake Ontario Railroad, the Shamokin Valley Railroad, and the Elmira and Williamsport Railroad, the last having been leased for 999 years.

FREDERICK & PENNSYLVANIA.

The Frederick and Pennsylvania Railroad Company, running from the Maryland State line near Kingsdale, to Frederick City, Maryland, a distance of 28 miles, was organized August 10, 1868, and began operation October 8, 1872. It was leased to the Pennsylvania system January 1, 1875. The road was sold under foreclosure on June 9, 1896, and after a temporary re-organization was sold to the Hanover and York Railroad, under the name of York, Pennsylvania and Frederick Railroad Company.

BALTIMORE, CHESAPEAKE & ATLANTIC.

The Baltimore, Chesapeake and Atlantic Railway Company was organized under the laws of the State of Maryland September 1, 1894. It acquired by purchase the line formerly owned by the Baltimore and Eastern Shore Steamboat

Company, the Maryland Steamboat Company and the Choptank Steamboat Company. There are 87.06 miles of railroad operated by this company, which also operates many more miles of water transportation.

WESTERN MARYLAND.

The Western Maryland Railroad Company was chartered in Maryland, March 1, 1853, and was opened for business December 17, 1873. On November 1, 1886, it took a lease for ninety-nine years on the Baltimore and Harrisburg Railroad and leased lines, and now practically owns them. In 1892 the line was completed from Williamsport to Cherry Run, where the Western Maryland and Baltimore and Ohio Railroad now connect. The length of the railroad is 228 miles, of which about 125 miles lie in Maryland and 103 in Pennsylvania.

NEW YORK, PHILADELPHIA AND NORFOLK.

The New York, Philadelphia and Norfolk Railroad Company was chartered September 17, 1881, as the successor to the Peninsula Railroad Company of Virginia. The Eastern Shore Railroad from Delmar, Delaware, to Crisfield, Maryland, distance thirty-eight miles, was purchased January 1, 1884. Extension from Pocomoke, Maryland, to Cape Charles, Virginia, distance sixty-five miles, was completed November 17, 1884. This company had a traffic contract till January, 1895, with the Pennsylvania Railroad Company, under which the latter set aside ten per cent. of the gross earnings from interchanged traffic to purchase first mortgage coupons. It operates about 112 miles of railroad and about thirty-six miles of ferry.

BALTIMORE AND LEHIGH.

The Baltimore and Lehigh Railway Company was formed July 31, 1894, of the Maryland division of the Baltimore and Lehigh Railroad Company, which was sold under foreclosure June, 1894, and purchased by the first mortgage bondholders. The Pennsylvania division of the Baltimore and Lehigh Company was subsequently reorganized as the York Southern Railroad Company. The entire length of the Baltimore and Lehigh Railway is 42.9 miles, all of which is within the State of Maryland.

BALTIMORE AND DELAWARE BAY.

The Baltimore and Delaware Bay Railroad runs from Chestertown, Maryland, to the Delaware State line, a distance of twenty-four miles, and from Worton Junction to Nicholson, Maryland, 3.72 miles, while the Smyrna and Delaware Bay Railroad (operated) runs from the State line to Bombay Hook, Delaware, a distance of 17.31 miles. The total line operated is 45.03 miles, of which thirty miles is within the State of Maryland. This company was formed in 1881, by a reorganization of the Kent County Railroad Company. The Smyrna and Delaware Bay Railroad is also owned by this company.

ANNAPOLIS AND BALTIMORE SHORT LINE.

The Annapolis and Baltimore Short Line was chartered January 6, 1880, and was completed and opened March 9, 1887. The Baltimore and Annapolis Short Line Railroad Company, running from Annapolis to Baltimore, a distance of 28 miles, was organized January 25, 1894, at which time the Annapolis and Baltimore Short Line was sold under foreclosure. The first mortgage bond holders purchased the road for \$100,000, and organized the present company. The Annapolis, Washington and Baltimore Railroad Company recently purchased this road, and is operating it.

WEST VIRGINIA CENTRAL AND PITTSBURG.

Under an Act of the Legislature of West Virginia, passed February 26, 1866, less than three years after the birth of the State, the Potomac and Piedmont Railroad Company was incorporated. Its title explains the purpose of its projectors. At Piedmont begins a long stretch of mountainous country, traversed by the Potomac river, from its source at the summit of the Alleghany mountains, underlaid with several valuable veins of coal. To mine and market this coal the company above named was organized, but circumstances prevented for many years the entering upon this object. On the 23d of February, 1881, an Act was passed by the West Virginia Legislature, which amended the original Act, changed the name of the company to "The West Virginia Central and Pittsburg Railway Company," and conferred upon it additional powers. The company not only was given the right to build a railroad and to mine and sell coal, but to build manufactories, saw-mills, furnaces, etc. The charter is very broad and liberal in its terms, and is one of the few special charters granted by the Legislature.

After the amendment and enlargement of the charter in February, 1881, active steps were taken toward the building of the road, and construction was at once begun. Piedmont was the starting point, and before the first of January following, the road had reached Elk Garden, where the company owns large tracts of mineral land, and upon which were at once opened the famous "Elk Garden Mines." The vein of coal here is a continuation of the big vein of George's Creek, which stream flows into the Potomac at Piedmont. From Elk Garden, the road was pushed along the waters of the Potomac to the top of the mountain, an elevation of over 3,000 feet, and a rise in fifty miles from Piedmont, of about 2,500 feet. After two or three years, during which the towns of Thomas and Davis were established on the crest of the mountains, coal mines opened then on an extensive scale, the construction of the road was resumed, and in 1890, reached the valley of Tygart's river, at a point sixty miles from Grafton. Here the town of Elkins was established, and made the western terminus of the road. Office buildings, machine and car shops were erected, and the headquarters of the company located at this point. Since then, branch lines have been built, seven miles to Beverly on the south, and eighteen miles to Belington on the north, the latter extension giving direct connection to the west by the Belington branch of the B. & O. Railroad.

In following the Potomac River the topography of the country was such at one point as to make it advisable to cross the river into Maryland, and the road remains in that State for eight miles, when it re-crosses the river into West Virginia. This eight miles is covered by a Maryland charter under the title of the West Virginia Central Railway Company in Maryland. The West Virginia Central is perhaps the largest single feeder of the Baltimore & Ohio, apart from the latter's own branch roads, and as nine-tenths of its traffic goes eastward, a large portion of it comes into the commerce of Baltimore. Much of the coal and coke mined and manufactured on its lines is re-shipped over the wharves of Baltimore to New England and Mexico. Maryland men have been largely interested in its affairs, and Baltimore has always been represented upon its board of directors.

PIEDMONT & CUMBERLAND.

With the growth of the West Virginia Central and Pittsburgh Railroad, and development of the country through which

it runs, came the necessity for additional outlets, and in 1887, under a separate charter, taken out under the laws of Maryland, a line of thirty miles was constructed eastward, known as the Piedmont & Cumberland Railway. It was built by those interested in the West Virginia Central & Pittsburg Railroad, and is a part of the latter system. It was at once leased to that company, and has been operated by it ever since. It therefore became the eastern thirty miles of the West Virginia Central and Pittsburg Railway, and made Cumberland the eastern terminus of that line. It also is built along the banks of the Potomac, crosses that stream several times, and is therefore partly in West Virginia, and partly in Maryland.

CUMBERLAND VALLEY RAILROAD.

The Cumberland Valley Railroad Company was incorporated by the Pennsylvania Legislature, by Act of April 2, 1831, and was opened from Chambersburg to Harrisburg November, 1837. The Franklin Railroad was chartered in Pennsylvania March 12, 1832, and in Maryland January 16, 1837. The road opened from Chambersburg, Pa., to Hagerstown, Md., 22 miles, in 1839. The present company was formed May 31, 1865, by a consolidation of the Cumberland Valley and Franklin Railroad Companies. This line operates 116 miles of road, of which 14 miles are in Maryland and 102 miles in Pennsylvania. The Mont Alto Railroad, formerly operated by the Cumberland Valley, is now operated by its own corporation, but in connection with the Cumberland Valley Road.

NORFOLK AND WESTERN RAILWAY.

The Norfolk and Western Railway Company was organized by a series of consolidations, as follows: The consolidation of the N. & P. Railroad Company, the Southside Railroad Company and the V. & T. Railroad Company to form the A., M. & O. Railroad Company was for the purpose of adjusting and closing the accounts assumed to have been fully consummated April 1, 1871, under authority of June 17, 1870. The consolidation of the New River R., M. & W. Co. and the Bluestone Railroad to form the New River Railroad of West Virginia was effected December 23, 1881, under authorization of the General Laws of West Virginia. The consolidation of the New River Railroad Company, the New River

Railroad Company of West Virginia and the East River Railroad Company with the Norfolk and Western Railroad Company was effected May 9, 1882, under authority of the General Laws of West Virginia and of Acts of Assembly of Virginia approved March 7, 1872, and various supplements thereof, and also Act of February 15, 1882.

The consolidation of the Clinch Valley Railroad Company with the Norfolk and Western Railroad Company was effected May 20, 1887, under authority of the Act of Assembly of Virginia, incorporating the Clinch Valley Railroad Company, approved April 6, 1887. The consolidation of the Norfolk Terminal Company with the Norfolk and Western Railroad Company was effected October 16, 1889, under authority of the Act of Assembly of Virginia, incorporating the Norfolk Terminal Company, approved March 6, 1882. The consolidation of the New River Plateau Railway Company with the Norfolk and Western Railroad Company was effected October 16th, 1889, under authority of the Act of Assembly of Virginia, incorporating the New River Plateau Railway Company, approved March 2d, 1888. The consolidation of the West Virginia & Iron-ton Railroad with the Norfolk and Western Railroad Company was effected September 30th, 1890, under authority of the Act of Assembly of Virginia, and the General Laws of the States of West Virginia and Kentucky.

The property and franchises of the Scioto Valley and New England Railroad and the Shenandoah Valley Railroad were acquired by purchase and merged into the general accounts of the Norfolk and Western Railroad. The property and franchises of the Norfolk, Lynchburg and Durham Railroad were acquired by purchase and merged into the general accounts of the Norfolk and Western Railway, under deed dated October 6th, 1896. The property and franchises of the Norfolk and Western Railroad were acquired by purchase at foreclosure sale, September 24th, 1896.

The property and franchises of the Columbus, Connecting and Terminal Railway were acquired by purchase, and merged into the general accounts of the Norfolk and Western Railway under deed, dated November 2d, 1896. The property and franchises of the Norfolk, Roanoke and Southern Railroad were acquired by purchase and merged into the general accounts of the Norfolk and Western Railway, under a deed dated December 2d, 1896.

ANNAPOLIS, WASHINGTON AND BALTIMORE.

The Annapolis and Elkridge Railroad Company was chartered March 21, 1837, and was opened for business, December 26, 1840. This road is entirely within the State of Maryland, running from Annapolis to Annapolis Junction, on the Baltimore and Ohio Railroad, a distance of 20.5 miles. The Annapolis and Elkridge Railroad was sold November 10, 1885, under foreclosure proceedings, for \$100,000 to the bondholders who reorganized it under the name of the Annapolis, Washington and Baltimore Railroad Company.

GEORGE'S CREEK AND CUMBERLAND.

The George's Creek and Cumberland Railroad was incorporated December 21, 1876, and commenced operation May 31, 1891. Consolidated June 16, 1888. It is controlled by the American Coal Company and the Maryland Coal Company of Baltimore, and consequently no returns are received for same.

The tables presented in the following pages of this report will require no further analysis than to state that they present the operations of the various roads within the State for two periods of one year each, the fiscal year ending June 30, 1897, and the fiscal year ending June 30, 1892. The operations as shown are the earnings as appear in tables 1 to 5, inclusive; the expenses, tables 6 to 9, inclusive; the passenger traffic, tables 10, 11 and 12; the freight traffic, tables 13 and 14; the number, wages and hours of work of employes, tables 15 to 31, inclusive; and the number of persons killed and injured by the various railroads as shown in tables 32 and 33.

TABLE No. 1.

Showing the Earnings from Passengers and from Express and Baggage of the Railroads Operating within the State of Maryland, for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	FROM PASSENGERS.		Increase.	Decrease.	FROM EXPRESS AND BAGGAGE.		Increase.	Decrease.
	1897.				1897.			
	1892.				1892.			
Baltimore & Ohio.....	\$1,071,898 36	\$843,166 99	.....	\$228,731 37	\$115,008 15	\$98,783 59	.....	\$16,224 56
(Phila. Wilm. & Balto.	1,783,661 27	1,503,977 52	.....	279,683 75	115,412 54	160,750 23	\$45,337 69	.....
Penna. } Northern Central...	334,373 45	249,991 36	.....	84,382 09	29,292 24	32,088 35	2,796 11	.....
System. { Frederick & Penna....	19,668 68	.....	.....	.....	2,010 09	.....	.....	.....
Bal., Ches. & Atlantic (R'y Div.)	69,068 62	44,934 83	.....	24,133 79	1,864 83	2,120 53	255 70	.....
Western Maryland.....	314,725 65	181,244 62	.....	133,471 03	21,585 38	30,573 04	8,987 66	.....
New York, Phila. & Norfolk. .	98,690 78	.....	.....	.....	8,927 16	.....	.....	.....
Baltimore & Lehigh.....	44,433 58	52,083 09	\$7,649 51	.....	2,669 89	3,955 90	1,316 01	.....
Baltimore & Delaware Bay.....	5,467 14	4,076 97	.....	1,390 17	367 98	535 87	167 89	.....
Annapolis, Wash. & Balto.	49,949 63	37,836 28	.....	12,113 35	4,286 60	3,631 22	.....	655 38
Piedmont & Cumberland.....	12,109 10	13,501 50	1,392 40	.....	1,269 56	1,041 41	.....	228 15
W. Va. Central & Pittsburg....	5,060 44	5,518 36	457 92	.....	325 74	425 65	99 91	.....
Cumberland Valley.....	50,912 37	14,626 34	.....	36,286 03	4,600 06	5,068 53	468 47	.....
Norfolk & Western.....	21,720 29	14,062 33	.....	7,657 96	1,771 51	1,478 80	.....	292 71
* Annapolis & Balto. Short Line.	.....	48,414 93	.....	.....	.....	2,655 78	.....	.....
Total	\$3,881,739 36	\$3,013,425 12	.....	\$868,304 24	\$309,391 84	\$343,138 90	\$33,747 06	.....

* No report in 1892.

TABLE No. 2.

Showing the Earnings from Mail and Other Sources in the Passenger Departments of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	FROM MAIL.		Increase.	Decrease.	FROM OTHER SOURCES.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore and Ohio.....	\$88,905 72	\$124,220 78	\$35,315 06	.....	\$28,329 26	\$20,610 64	.....	\$7,718 62
Penna. { Phila., Wilm. & Balto.	104,268 10	130,505 62	26,237 52	.....	109,650 40	19,410 15	.....	90,240 25
System { Northern Central....	15,469 28	18,804 48	3,335 20	.....	23,738 66	17,889 54	.....	5,849 12
Frederick and Penna.	2,096 40	.....	.....	.....	1,047 84	.....	.....	.....
Balto., Ches. & Atlan. (R'y Div.)	1,982 82	3,866 03	1,883 21	.....	484 17	.....	.....	.....
Western Maryland.....	27,562 25	13,628 94	.....	\$13,933 31	36,512 01	14,638 57	.....	21,873 47
New York, Phila and Norfolk.	13,781 46	.....	.....	.....	8,049 77	.....	.....	.....
Baltimore and Lehigh.....	2,591 59	3,437 54	845 95	.....	8,241 38	21,031 33	\$12,789 95	.....
Baltimore and Delaware Bay....	1,372 10	1,611 78	239 68	.....	.....	60	.....	.....
Annapolis, Wash. and Baltimore.	1,852 12	1,331 20	.....	521 92	136 00	.....	.....	.....
Piedmont and Cumberland.....	1,166 68	1,575 92	409 24	.....	52 68	103 37	50 69	.....
W. Va. Central and Pittsburg...	362 46	644 11	281 65	.....	15 54	42 25	26 71	.....
Cumberland Valley.....	2,081 19	2,362 14	280 95	.....	.....	.....	.....	.....
Norfolk and Western.....	1,461 95	1,877 85	415 90	.....	.....	200 38	200 38	.....
Annapolis and Balto. Short Line.	.....	1,527 50	.....	.....	.....	1,395 81	.....	.....
Total.....	\$264,954 12	\$304,799 89	\$39,845 77	.....	\$216,257 61	\$95,312 64	.....	\$120,944 97

TABLE No. 3.

Showing the Earnings from Freight Carried and from Other Sources in the Freight Department of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	FROM FREIGHTS.		Increase.	Decrease.	FROM OTHER SOURCES.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore & Ohio.....	\$3,104,858 03	\$3,056,141 98	.....	\$ 48,716 05	\$113,308 14	\$120,763 08	\$7,454 94	.....
Penna. } Phila., Wilm. & Balto.	1,699,043 81	1,540,541 14	.....	148,502 57	.....	37,490 56	.....	.....
System. } Northern Central.....	936,470 71	995,114 71	\$58,644 00	.....	.....	46,231 62	5,359 49	.....
..... } Frederick & Penna.....	33,349 76	.....	.....	.....	.....	.....	.....	.....
Bal., Ches. & Atlantie (R'y Div.)	38,026 90	36,975 51	.....	1,051 39	.....	154 18	154 18	.....
Western Maryland.....	371,737 90	435,114 96	63,377 06	.....	17,198 74	12,982 05	.....	\$4,216 69
New York, Phila. & Norfolk.....	251,974 46	11,604 76	.....	.....	11,883 48	.....	.....	.....
Baltimore & Lehigh.....	47,728 04	43,703 62	.....	4,004 42	1,264 40	51 05	.....	1,213 35
Baltimore & Delaware Bay.	22,820 10	12,636 57	1,141 40	11,215 34	.....	.....	.....	.....
Annapolis, Wash. & Balto.....	11,495 17	12,636 57	.....	.....	.....	100 00	100 00	.....
Piedmont & Cumberland.....	134,890 36	85,699 41	.....	49,790 95	.....	92 91	4 73	.....
W. Va. Central & Pittsburg.	21,833 40	35,027 23	13,193 83	.....	88 18	37 98	.....	5,912 88
Cumberland Valley.....	82,818 74	47,969 15	.....	34,858 59	5,950 86	.....	.....	.....
Norfolk & Western.....	87,042 01	86,956 33	.....	85 68	3,470 64	.....	.....	1,136 64
Annapolis & Balto. Short Line..	.....	18,590 97	.....	.....	1,938 18	801 54	.....	.....
Total.....	\$6,844,088 39	\$6,416,067 34	.....	\$438,021 05	\$195,974 75	\$218,704 97	\$22,730 22	.....

TABLE No. 4.

Showing the total Earnings of the Passenger and Freight Departments of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	PASSENGER DEPARTMENT.		Increase.	Decrease.	FREIGHT DEPARTMENT.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore and Ohio.....	\$1,304,141 49	\$1,086,782 00	.....	\$217,359 49	\$3,218,166 17	\$3,176,905 06	.....	\$41,261 11
Penna. { Phila., Wilm. & Balto.	2,112,992 31	1,814,643 52	.....	298,348 79	1,699,043 81	1,578,030 70	.....	121,013 11
System { Northern Central	402,873 63	318,773 73	.....	94,099 90	977,342 84	1,041,346 33	\$68,003 49	.....
Balto., Ches. & Atlan. (R'y Div.)	24,822 92	.....	.....	.....	33,349 76	.....	.....	.....
Western Maryland.....	73,400 44	50,921 39	.....	22,479 05	38,026 90	37,129 69	.....	897 21
New York, Phila. and Norfolk..	400,385 32	240,085 17	.....	160,300 15	388,936 64	448,097 02	59,160 38	.....
Baltimore and Leligh	129,449 17	.....	.....	.....	263,857 94	.....	.....	.....
Baltimore and Delaware Bay...	57,936 44	78,817 30	\$20,880 86	.....	48,992 44	43,755 67	.....	5,136 77
Annapolis, Wash. and Baltimore.	7,207 22	6,284 62	.....	922 60	22,820 10	11,604 76	.....	11,215 34
Piedmont and Cumberland.....	56,224 35	42,798 70	.....	13,425 65	11,495 17	12,736 57	1,241 40	.....
W. Va. Central and Pittsburg..	14,597 96	16,222 20	1,624 24	.....	134,978 54	85,792 36	.....	69,186 18
Cumberland Valley	5,764 28	6,630 37	866 09	.....	27,764 26	35,065 21	7,300 95	.....
Norfolk and Western.....	57,593 62	22,057 01	.....	35,536 61	86,289 38	47,960 15	.....	39,229 23
Annapolis and Balto. Short Line	24,953 75	17,619 36	.....	7,334 39	88,979 19	87,757 87	.....	1,211 32
Total.....	\$4,672,342 90	\$3,554,619 39	.....	\$1,117,723 51	\$7,940,063 14	\$6,624,772 36	.....	\$415,290 78

TABLE No. 5.

Showing the Total Earnings from all Sources of the Railroads Operating within the State of Maryland, for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	TOTAL EARNINGS.		Increase.	Decrease.
	1892.	1897.		
Baltimore & Ohio.....	\$4,522,307 66	\$4,263,687 06	.....	\$258,620 60
{ Phila., Wilm. & Balto.....	3,812,036 12	3,392,675 22	.....	419,360 90
Penna. System, { Northern Central	1,350,216 47	1,360,120 06	.....	20,096 41
{ Frederick & Penna.....	58,172 68	.....	.....	.....
Balto., Ches. & Atlantic.....	111,427 34	88,051 08	.....	23,376 26
Western Maryland.....	789,321 96	688,182 19	.....	101,139 77
New York, Phila. & Norfolk.....	393,307 11	.....	.....	.....
Baltimore & Lehigh.....	106,928 88	122,572 97	\$15,644 09	.....
Baltimore & Delaware Bay.....	30,027 32	17,889 38	.....	12,137 94
Annapolis, Washington & Baltimore.....	67,719 52	55,535 27	.....	12,174 25
Piedmont & Cumberland.....	149,576 50	102,014 52	.....	47,561 98
W. Va. Central & Pittsburg.....	33,548 54	41,695 58	8,047 04	.....
Cumberland Valley.....	143,883 00	70,017 16	.....	73,865 84
Norfolk & Western.....	113,932 94	105,377 23	.....	8,555 61
Annapolis & Baltimore Short Line .....	.....	72,574 99	.....	.....
Total.....	\$11,722,406 04	\$10,580,392 71	.....	\$1,142,003 33

TABLE No. 6.

Showing the Expenses for Maintenance of Way and Buildings and Maintenance of motive power and cars of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	MAINTENANCE OF WAY AND BUILDINGS.		Increase.	Decrease.	MAINTENANCE OF MOTIVE POWER & CARS.		
	1892.	1897.			1892.	1897.	
Baltimore & Ohio.....	\$556,561 60	\$688,960 22	132,398 62	.....	\$627,378 43	\$586,973 70	.....
Penna. } Phila., Wil. & Balto..	677,235 79	497,679 24	.....	\$179,556 55	423,296 40	433,557 40	\$10,261 00
System. } Northern Central...	158,194 16	157,111 89	.....	1,082 27	528,649 94	222,934 84	.....
Frederick & Penna....	25,185 34	.....	.....	.....	13,592 35	.....	.....
Balt. Ches. & Atlantic (R'y Div.)	23,876 88	28,362 13	4,485 25	.....	32,254 29	8,376 79	.....
Western Maryland.....	101,421 60	79,157 08	.....	22,264 52	75,085 88	64,327 77	.....
New York, Phila. & Norfolk	54,556 02	.....	.....	.....	50,342 02	.....	.....
Baltimore & Lehigh.....	20,890 38	23,227 37	2,336 99	.....	34,687 15	14,805 82	.....
Baltimore & Delaware Bay...	16,052 78	7,118 91	.....	.....	1,111 80	1,415 14	303 34
Annapolis, Wash. & Balto....	7,988 13	11,289 18	3,301 05	8,933 87	3,232 03	4,030 44	798 41
Piedmont & Cumberland.....	26,731 82	18,933 75	.....	.....	14,056 16	17,910 73	3,854 57
W. Va. Central & Pittsburgh...	8,933 42	7,738 64	.....	7,797 67	2,521 58	7,320 51	4,798 98
Cumberland Valley.....	21,477 77	20,563 67	.....	1,194 78	54,772 15	16,379 97	.....
Norfolk & Western.....	9,771 11	.....	.....	914 10	11,502 17	.....	.....
Annapolis & Balto. Short Line.	.....	*48,229 40	.....	.....	.....	.....	.....
Total.....	\$1,708,876 30	\$1,588,381 48	.....	\$110,494 82	\$1,872,478 35	\$1,377,933 11	494,540 24

* Including motive power and cars, and conducting transportation.

TABLE No. 7.

Showing the Expenses of Conducting Transportation and the General Expenses of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	CONDUCTING TRANSPORTATION.		Increase.	Decrease.	GENERAL EXPENSES.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore & Ohio.....	\$1,741,102	46\$1,748,882	33	.....	\$294,484	83	\$21,047	88
Penna. } Phila., Wil. & Balto..	1,480,813	43 1,518,550	11	.....	226,424	29	.....	165,938
System. } Northern Central ...	536,665	20 565,370	94	.....	16,897	56	7,738	40
Frederick & Penna..	20,430	49	.....	.....	.....	.....	.....	.....
Balt., Ches. & Atlantic (R'y Div.)	28,601	55 50,695	83	.....	*33,763	48	.....	.....
Western Maryland.....	301,600	57 259,546	87	.....	58,144	70	.....	12,193
New York, Phila. & Norfolk	165,044	74	.....	\$42,053	32,419	21	.....	39
Baltimore & Lehigh.....	25,550	37 47,875	42	.....	13,538	02	.....	5,059
Baltimore & Delaware Bay.....	19,434	26 8,956	95	.....	1,288	64	577	77
Annapolis, Wash. & Balto.....	24,180	92 21,434	85	10,477	5,675	37	1,866	41
Piedmont & Cumberland.....	37,625	66 27,787	90	2,746	10,318	06	4,014	92
W. Va. Central & Pitsburg.....	8,010	42 11,357	52	9,847	1,792	24	5,509	57
Cumberland Valley.....	31,373	54 43,385	42	.....	4,771	51	2,251	87
Norfolk & Western.....	41,677	33 14,676	59	.....	17,377	87	4,605	71
Annapolis & Balto. Short Line.	.....	.....	.....	27,000	11,547	07	5,830	80
Total...	\$4,462,120	94 \$4,318,520	73	\$143,600	\$711,054	98	\$497,620	03
								213,434

* For ferry services; no report for "general expenses."

TABLE No. 8.

Showing the Amount of Taxes Paid by the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	TAXES PAID.		Increase.	Decrease.
	1892.	1897.		
Baltimore & Ohio.	\$74,577 72	\$87,444 77	\$12,867 05	.....
{ Phila., Wilmington & Baltimore.	50,979 37	47,991 79	.....	\$2,987 58
Penna. System, { Northern Central.	.....	.....	.....	.....
{ Frederick & Pennsylvania.	1,515 00	.....	.....	1,525 00
Baltimore, Chesapeake & Atlantic (Railway Div.).	.....	13,138 44	13,138 44	.....
Western Maryland.	6,298 67	.....	.....	.....
New York, Philadelphia & Norfolk.	3,688 77	3,890 74	201 97	6,298 67
Baltimore & Lehigh.	380 78	265 05	.....	.....
Baltimore & Delaware Bay.	1,745 67	1,864 72	119 05	115 73
Annapolis, Washington & Baltimore.	.....	3,450 14	.....	.....
Piedmont & Cumberland.	800 00	1,410 15	610 15	.....
West Virginia Central & Pittsburg.	1,985 90	2,907 26	921 36	.....
Cumberland Valley.	2,158 67	3,309 33	1,150 66	.....
Norfolk & Western. ....	.....	3,627 91	3,627 91	.....
Annapolis & Baltimore Short Line. ....	.....	.....	.....	.....
Total.	\$144,130 55	\$163,300 30	\$25,169 75	.....

TABLE No. 9.

Showing the Total Amount of Expenses of all Kinds of the Railroads Operating Within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	TOTAL EXPENSES.		Increase.	Decrease.
	1892.	1897.		
Baltimore and Ohio.....	\$3,294,105 04	\$3,422,793 74	\$128,688 70	.....
Penna. { Phila., Wilm. & Balto.....	2,358,749 28	2,558,244 61	.....	\$300,504 37
System { Northern Central.....	1,240,397 86	970,053 63	.....	270,344 23
Balto., Ches. & Atlan. (Ry Div.).....	60,723 18	.....	.....	.....
Western Maryland.....	118,496 20	87,434 75	.....	31,061 45
New York, Phila and Norfolk.....	536,252 75	462,121 47	.....	74,131 28
Baltimore and Lehigh.....	308,660 66	.....	.....	.....
Baltimore and Delaware Bay.....	98,344 69	98,268 04	.....	76 65
Annapolis, Wash. and Baltimore.....	38,268 26	19,622 49	.....	18,645 77
Piedmont and Cumberland.....	42,822 12	42,638 41	.....	188 71
W. Va. Central and Pittsburg.....	88,741 20	73,592 05	.....	15,149 15
Cumberland Valley.....	22,057 66	30,078 69	8,021 03	.....
Norfolk and Western.....	114,380 87	87,742 03	.....	26,638 84
Annapolis and Balto. Short Line.....	76,656 35	79,034 50	2,378 15	.....
Total.....	\$8,898,656 12	\$7,990,426 36	.....	\$908,229 76

TABLE No. 10.

Showing the Number of Passengers Carried and the Number of Passengers Carried One Mile by the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	NUMBER OF PASSENGERS CARRIED.		Increase.	Decrease.	NUMBER OF PASSENGERS CARRIED ONE MILE.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore & Ohio.....	1,861,572	1,390,680	.....	470,892	59,054,656	48,269,877	.....	10,784,779
Penna. } Phila., Wil. & Balto..	4,576,003	3,468,664	.....	1,109,339	86,149,151	76,606,246	.....	9,542,905
System. } Northern Central ...	1,886,619	1,003,805	.....	882,814	16,257,590	11,622,374	.....	4,635,216
Frederick & Penna....	67,244	.....	.....	.....	881,884	.....	.....	.....
Balt., Ches. & Atlantic (R'y Div.)	151,563	121,251	.....	30,312	3,283,333	3,481,330	197,997	.....
Western Maryland	686,644	621,997	.....	64,647	12,811,710	12,092,311	.....	719,399
New York, Phila. & Norfolk ..	99,399	.....	.....	.....	3,886,653	.....	.....	.....
Baltimore & Lehigh	153,926	136,180	.....	17,746	1,887,932	2,299,322	411,390	.....
Baltimore & Delaware Bay	13,492	8,340	.....	5,152	337,300	208,500	.....	128,800
Piedmont & Cumberland	40,674	26,035	.....	14,639	426,376	483,519	57,143	.....
W. Va. Central & Pittsburg	11,116	10,641	.....	475	173,508	197,625	24,117	.....
Cumberland Valley	130,613	.....	.....	.....	2,313,460	.....	.....	.....
Norfolk & Western	24,551	17,164	.....	7,387	876,870	606,652	.....	270,218
Annapolis & Balto. Short Line.	.....	169,893	.....	.....	.....	.....	.....	.....
Total	9,703,356	6,974,650	.....	2,728,706	188,270,426	155,867,756	.....	32,402,670

TABLE No. II.

Showing the Average Earning and Expense per Mile per Passenger on the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	AVERAGE EARNING PER MILE PER PASSENGER.		Increase.	Decrease.	AVERAGE EXPENSE PER MILE PER PASSENGER.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore & Ohio.....	\$.02224	\$.01747	.....	\$ .00477	\$.01746	.....	.....	.....
Penna. } Phila., Wilm. & Balto	.02070	.01963	.....	.00107	.01830	\$.01782	.....	\$ .00048
System. } Northern Central....	.02057	.02151	\$.00094	.....	.02061	.02194	\$.00133	.....
Frederick & Penna....	.02422	.....	.....	.....	.03691	.....	.....	.....
Bal., Ches. & Atlantic (R'y Div.)	.02635	.01290	.....	.01345	.02100	.....	.....	.....
Western Maryland.....	.01700	.....	.....	.....	*	.....	.....	.....
New York, Phila. & Norfolk....	.02539	.....	.....	.....	.02556	.....	.....	.....
Baltimore & Lehigh .....	.02356	.02222	.....	.00144	.02601	.01361	.....	.01240
Baltimore & Delaware Bay. ....	.03000	.01900	.....	.01100	.04000	.02300	.....	.01700
Annapolis, Wash. & Balto. ....	.....	.....	.....	.....	.....	.....	.....	.....
Piedmont & Cumberland. ....	.03420	.02792	.....	.00628	.03100	.03040	.....	.00060
W. Va. Central & Pitsburg. ....	.03320	.02792	.....	.00528	.03100	.03010	.....	.00060
Cumberland Valley .....	.02260	.....	.....	.....	.02100	.....	.....	.....
Norfolk & Western .....	.02477	.02318	.....	.00159	.01897	.....	.....	.....
Annapolis & Balto. Short Line..	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	.....	.....	.....	.....	.....

*No record kept.

TABLE No. 12.

Showing the gain or loss per mile per Passenger on the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	GAIN PER MILE PER PASSENGER		Increase.	Decrease.	LOSS PER MILE PER PASSENGER.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore and Ohio.....	\$.00478							
Penna. { Phila., Wilm. & Balto.	.00240	.00181		.00059	\$.00004	\$.00043	\$.00039	
System { Northern Central .....					.01265			
Frederick and Penna.								
Balto., Ches. & Atlan. (R'y Div.)	.00535							
*Western Maryland.....								
New York, Phila. and Norfolk.					.00017			
Baltimore and Lehigh.....		.00861			.00235			
Baltimore and Delaware Bay...					.01000	.00400		\$.00800
Annapolis, Wash. and Baltimore.								
Piedmont and Cumberland.....	.00310					.00248		
W. Va. Central and Pittsburg...	.00220					.00248		
Cumberland Valley .....	.00100							
Norfolk and Western.....	.00580							
Annapolis and Balto. Short Line								
Total.....								

*No record kept.

TABLE No. 13.

Showing the Number of Tons of Freight Carried and the Average Rate per Ton per Mile received for Carrying Same by the Railroads Operating Within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	TONS OF FREIGHT CARRIED.		Increase.	Decrease.	AVERAGE RATE PER TON PER MILE FOR FREIGHT.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
Baltimore & Ohio	\$2,754,300	\$3,119,443	\$365,143	.....	\$ .00651	\$.00524	.....	.00127
Penna. (Phila., Wtl. & Balto.)	2,122,742	1,962,426	.....	\$160,316	.01417	.01266	.....	.00151
System. (Northern Central)	2,480,994	2,311,290	830,296	.....	.00650	.00562	.....	.00088
Balt. Ches. & Atlantic (R'y Div.)	104,376	.....	.....	.....	.01876	.....	.....	.....
Western Maryland.....	51,193	47,041	.....	4,152	.03100	.03850	.00750	.....
New York, Phila. & Norfolk ..	496,881	1,053,082	556,201	.....	.01400	.....	.....	.....
Baltimore & Lehigh.....	43,417	45,114	1,697	.....	.01037	.....	.....	.....
Baltimore & Delaware Bay....	32,492	23,522	.....	8,970	.03736	.04003	.00267	.....
Piedmont & Cumberland.....	1,037,706	229,564	.....	828,142	.04000	.02000	.....	.02000
W. Va. Central & Pittsburg....	336,296	93,828	.....	242,468	.00620	.02658	.02038	.....
Cumberland Valley.....	151,863	.....	.....	.....	.00770	.00658	.....	.00112
Norfolk & Western.....	73,482	69,677	.....	.....	.01245	.....	.....	.....
Annapolis & Balto. Short Line.	.....	30,886	.....	3,805	.00545	.00446	.....	.00099
Total	\$9,934,193	\$9,985,873	\$51,680	.....	.....	.....	.....	.....

TABLE No. 14.

Showing the Number of Tons of Freight Carried One Mile by the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	NUMBER OF TONS OF FREIGHT CARRIED ONE MILE.		Increase.	Decrease.
	1892.	1897.		
Baltimore & Ohio.	476,593,837	583,179,293	136,585,456	.....
{ Phila., Wilmington & Baltimore.	119,863,898	121,723,636	1,859,738	.....
Penna. System. { Northern Central	144,141,954	176,958,271	32,816,307	.....
{ Frederick & Pennsylvania.	1,777,448	.....	.....	.....
Baltimore, Chesapeake & Atlantic (Railway Div.)	1,222,707	960,046	.....	262,661
Western Maryland.	19,461,409	51,649,129	32,187,720	.....
New York, Philadelphia & Norfolk	22,946,394	.....	.....	.....
Baltimore & Leligh.	1,270,747	1,075,770	.....	194,977
Baltimore & Delaware Bay.	812,399	508,707	.....	243,693
Annapolis, Washington & Baltimore.	.....	.....	.....	.....
Piedmont & Cumberland.	21,693,560	13,026,930	.....	8,666,630
West Virginia Central & Pittsburg.	2,824,886	5,324,392	2,499,506	.....
Cumberland Valley.	6,641,412	.....	.....	.....
Norfolk & Western	15,985,365	19,494,504	3,509,139	.....
Annapolis & Baltimore Short Line.	.....	.....	.....	.....
Total	835,236,016	973,960,671	138,724,655	.....

TABLE No. 15.

Showing the Number, Monthly Wages and Hours of Work of the General Officers and Division Superintendents of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	GENERAL OFFICERS.				DIVISION SUPERINTENDENTS.			
	1892.		1897.		1892.		1897.	
	No	Average Monthly Wages.	Hours per Day.	No.	Average Monthly Wages.	Hours per Day.	No.	Average Monthly Wages.
Baltimore and Ohio.....	21	\$488 17	8	35	\$505 07	..	17	\$154 56
Penna. { Philadelphia, Wilm. and Balto.	3	328 44	..	3	328 44	..	2	196 33
System { Northern Central.....	10	294 50	..	10	294 50	..	..	..
Frederick and Pennsylvania..	..	..	..	..	..	..	1	54 00
Balto., Ches. and Atlantic (R'y Div.)..	2	125 00	..	..	..	..	1	54 00
Western Maryland.....	6	319 45	..	6	319 45	..	1	150 00
New York, Philadelphia and Norfolk..	2	133 33	..	..	..	..	..	..
Baltimore & Lehigh.....	3	188 88	10	5	98 33	..	..	..
Baltimore and Delaware Bay.....	1	125 00	10	..	..	..	..	..
Annapolis, Washington and Baltimore..	2	179 16	..	1	298 00	..	1	150 00
Piedmont and Cumberland.....	..	..	..	..	..	..	..	..
West Virginia Central and Pittsburg... }	8	159 26	9	12	113 52	9	..	..
Cumberland Valley.....	1	250 00	9	..	..	..	..	..
Norfolk and Western.....	1	400 00	..	..	..	..	..	..
Annapolis and Baltimore Short Line.....	..	..	..	3	..	..	..	..
Total.....	60	\$349 27	9	65	\$257 98	9	3	\$125 16
							22	\$140 97
								8

TABLE No. 17.

Showing the Number, Monthly Wages and Hours of Work of the Road Masters and Clerical Force of the Railroads Operating Within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	ROAD MASTERS.				CLERKS.			
	1892.		1897.		1892.		1897.	
	No.	Average Monthly Wages.	Hrs. Per Day.	Average Monthly Wages.	Hrs. Per Day.	No.	Average Monthly Wages.	Hrs. Per Day.
Baltimore & Ohio.....	6	\$95 74	.....	.....	.....	237	\$57 11	8
Penna. System, { Phila., Wilm. & Balto..	19	90 00	.....	6 \$95 74	.....	142	53 02	8
{ Northern Central.....	1	36 00	.....	19 90 00	.....	246	57 75	.....
Balto., Ches. & Atlantic (R'y Div.).....	1	30 00	10	1 36 00	.....	1	45 00	.....
Western Maryland.....	1	150 00	.....	.....	.....	5	35 00	10
New York, Phila. & Norfolk.....	1	90 00	.....	1 150 00	.....	35	47 00	.....
Baltimore & Lehigh.....	1	75 00	10	.....	.....	28	52 65	.....
Baltimore & Delaware Bay.....	1	65 00	10	.....	.....	13	30 00	10
Annapolis, Washington & Baltimore.....	1	75 00	10	.....	.....	1	75 00	10
Piedmont & Cumberland.....	.....	.....	.....	1 75 00	10	2	35 25	10
W. Va. Central & Pittsburg.....	.....	.....	.....	.....	.....	48	31 52	9
Cumberland Valley.....	.....	.....	.....	.....	.....	3	72 00	9
Norfolk & Western.....	.....	.....	.....	.....	.....	6	55 00	.....
Annapolis & Baltimore Short Line.....	.....	.....	.....	1 .....	.....	.....	.....	.....
Total.....	32	\$78 53	10	29 \$89 34	10	767	\$49 79	9
						928	\$48 37	10

TABLE No. 19.

Showing the Number, Daily Wages and Hours of Work of the Passenger Baggage-men and Engineers of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	BAGGAGEMEN.					ENGINEERS.				
	1892.		1897.			1892.		1897.		
	No.	Daily Wages.	Hours per Day.	No.	Daily Wages.	Hours per Day.	No.	Daily Wages.	Hours per Day.	No.
Baltimore and Ohio.	63	* \$1 95	.....	63	\$1 95	.....	170	\$3 76	.....	195
Penna. { Philadelphia, Wilm. and Balto.	10	2 15	.....	10	2 15	.....	64	4 09	.....	64
System { Northern Central.	2	1 50	.....	2	1 50	.....	11	4 21	.....	11
Frederick and Pennsylvania ..	2	1 25	10	1	1 33	.....	2	4 00	.....	2
Balto., Ches. and Atlantic (R'y Div.) ..	2	*	.....	1	.....	.....	5	3 00	10	2
Western Maryland.	1	1 60	.....	.....	.....	.....	35	2 73	.....	35
New York, Philadelphia and Norfolk ..	4	1 50	10	3	1 58	.....	4	4 50	.....	.....
Baltimore and Lehigh.	1	1 00	7	.....	.....	.....	7	2 65	10	3
Baltimore and Delaware Bay.	1	1 95	.....	2	1 64	10	1	2 40	7	1
Annapolis, Washington and Baltimore ..	3	1 76	9	5	1 00	10	2	3 55	10	2
Piedmont and Cumberland. ....	.....	.....	.....	.....	.....	.....	3	4 00	9	5
West Virginia Central and Pittsburg.. {	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland Valley. ....	.....	.....	.....	.....	1 85	.....	5	3 40	.....	.....
Norfolk and Western. ....	.....	.....	.....	.....	.....	.....	5	3 13	.....	3
Annapolis and Baltimore Short Line ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Total.	87	\$1 47	9	86	\$1 62	10	314	\$3 49	9	326
								\$3 30		9

*Included in "Brakemen," Table 18.

TABLE No. 20.

Showing the Number, Daily Wages and Hours of Work of the Firemen and the Freight and Yard Conductors of the Railroads Operating Within the State of Maryland, for the Year Ending June 30, 1897, as Compared With the Year Ending June 30, 1892.

NAME OF RAILROAD.	FIREMEN.				FREIGHT AND YARD CONDUCTORS.			
	1892.		1897.		1892.		1897.	
	No.	Daily Wages.	Hrs. Per Day.	Daily Wages.	Hrs. Per Day.	No.	Daily Wages.	Hrs. Per Day.
Baltimore & Ohio.....	179	\$1 96	.....	\$1 78	.....	.....	*	.....
Penna. System. { Phila., Wilm. & Balto.	55	2 24	.....	2 24	.....	54	\$3 59	.....
{ Northern Central.	11	2 11	.....	2 11	.....	75	2 95	.....
{ Frederick & Penna.	2	1 60	.....	1 60	.....	2	1 90	.....
Baltimore, Ches. & Atlantic (R'y Div.)....	5	1 25	10	1 33	8	3	3 00	10
Western Maryland.	37	1 30	37	1 30	.....	.....	*	.....
New York, Phila. & Norfolk	3	2 80	.....	.....	.....	12	4 00	.....
Baltimore & Lehigh.....	7	1 40	10	1 55	.....	2	2 20	10
Baltimore & Delaware Bay	1	1 50	7	1 31	6	.....	*	.....
Annapolis, Washington & Baltimore.	2	2 20	10	1 75	10	.....	.....	.....
Piedmont & Cumberland.	3	2 09	9	1 75	10	10	2 89	.....
West Virginia Central & Pittsburg.	5	1 60	.....	2 00	.....	7	2 50	10
Cumberland Valley	5	1 52	.....	2 24	.....	.....	2 75	.....
Norfolk & Western .....	.....	.....	.....	.....	.....	.....	*	.....
Annapolis & Baltimore Short Line .....	.....	.....	.....	.....	.....	.....	.....	.....
Total	315	\$1 81	9	\$1 79	9	158	\$2 98	10
						140	\$2 87	10

* Included in Passenger Department.

TABLE No. 21.

Showing the Number, Daily Wages and Hours of Work of the Freight and Yard Engineers and Firemen of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	FREIGHT AND YARD ENGINEERS.				FREIGHT AND YARD FIREMEN.			
	1892.		1897.		1892.		1897.	
	No.	Daily Wages.	Hours per Day.	No.	Daily Wages.	Hours per Day.	No.	Daily Wages.
Baltimore and Ohio.....	55	\$4 11	.....	55	*	.....	62	*
Penna. { Philadelphia, Wilm. and Balto.	58	3 70	.....	58	\$4 14	.....	60	\$2 00
System { Northern Central.....	2	2 00	.....	3	3 70	.....	2	1 80
Balto., Ches. and Atlantic (Ry Div.).....	2	3 00	10	3	.....	.....	2	1 00
Western Maryland.....	11	4 00	.....	11	2 00	10	2	1 30
New York, Philadelphia and Norfolk....	2	2 50	10	1	.....	.....	1	1 16
Baltimore & Lehigh.....	.....	*	.....	.....	2 50	.....	.....	.....
Baltimore and Delaware Bay.....	.....	.....	.....	.....	1 60	10	1	1 55
Annapolis, Washington and Baltimore....	.....	.....	.....	.....	*	.....	.....	*
Piedmont and Cumberland.....	9	3 64	.....	9	3 12	10	9	1 75
West Virginia Central and Pittsburg... }	.....	*	.....	.....	.....	.....	.....	10
Cumberland Valley.....	.....	*	.....	.....	3 50	10	.....	2 00
Norfolk and Western.....	.....	.....	.....	.....	*	.....	.....	*
Annapolis and Baltimore Short Line.....	.....	.....	.....	1	.....	.....	1	.....
Total.....	137	\$3 28	10	127	\$3 14	10	148	\$1 71
					\$1 69	10	136	\$1 71

* Included in Passenger Department.

TABLE No. 22.

Showing the Number, Daily Wages and Hours of Work of the Freight and Yard Brakemen and Machinists of the Railroads Operating within the State of Maryland, for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	FREIGHT AND YARD BRAKEMEN.				MACHINISTS.			
	1892.		1897.		1892.		1897.	
	No.	Daily Wages.	Hours Per Day.	No.	Daily Wages.	Hours Per Day.	No.	Daily Wages.
Baltimore & Ohio.	203	*	.....	203	*	.....	102	\$1 98
{ Phila., Wilm. & Balto.	130	\$2 20	.....	130	\$2 20	.....	87	2 39
Penna. System,	6	1 76	.....	130	1 76	.....	91	1 90
{ Frederick & Penna.	11	1 20	.....	5	.....	.....	.....	.....
Balto., Ches. & Atlantic (R'y Div.).	42	1 25	10	.....	.....	.....	2	1 33
Western Maryland.	4	*	10	.....	.....	.....	14	2 21
New York, Phila. & Norfolk.	4	1 80	.....	.....	.....	.....	.....	.....
Baltimore & Lehigh.	.....	1 70	10	2	1 58	9	4	2 03
Baltimore & Delaware Bay.	.....	*	.....	.....	*	.....	1	2 50
Annapolis, Washington & Baltimore.	.....	.....	.....	.....	.....	.....	.....	.....
Piedmont & Cumberland.	25	1 92	.....	14	1 78	10	2	1 80
W. Va. Central & Pittsburg.	.....	.....	.....	.....	1 85	10	4	2 30
Cumberland Valley.	.....	*	.....	.....	*	.....	2	2 18
Norfolk & Western.	.....	*	.....	2	.....	.....	2	.....
Annapolis & Baltimore Short Line.	.....	.....	.....	.....	.....	.....	.....	.....
Total.	421	\$1 69	10	356	\$1 72	10	318	\$2 26
							305	\$2 10
								10

*Included in Passenger Department.

TABLE NO. 24.

Showing the Number, Daily Wages and Hours of Work of Station Agents of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	STATION AGENTS, (Not Telegraph Operators.)				STATION AGENTS, (Also Telegraph Operators.)			
	1892.		1897.		1892.		1897.	
	No.	Daily Wages.	Hours per Day.	No.	Daily Wages.	Hours per Day.	No.	Hours per Day.
Baltimore and Ohio.....	75	\$1 42	.....	69	\$1 45	.....	151	10
Penna. { Phila., Wilm. and Balto.....	*98	1 97	.....	*98	1 97	.....	181	.....
System. { Northern Central.....	*50	2 00	.....	*50	2 00	.....	.....	.....
Baltimore, Ches. and Atlantic (R'y Div.)..	3	1 67	8	3	1 67	8	4	10
Western Maryland.....	7	1 20	.....	8	65	12	16	19
New York, Philadelphia and Norfolk.....	*53	1 00	10	53	1 00	.....	.....	12
Baltimore and Lehigh.....	24	1 25	.....	.....	.....	.....	9	.....
Baltimore and Delaware Bay.....	2	80	.....	11	67	.....	18	.....
Annapolis, Washington and Baltimore..	3	90	.....	2	57	2	6	10
Piedmont and Cumberland.....	.....	.....	.....	.....	.....	.....	.....	5
W. Va. Central and Pittsburgh.....	5	1 00	.....	1	1 40	10	4	12
Cumberland Valley.....	8	2 00	.....	5	1 86	10	27	10
Norfolk and Western.....	3	1 78	.....	2	1 63	.....	10	.....
Annapolis and Baltimore Short Line. ....	.....	.....	.....	1	.....	.....	2	.....
Total.....	340	\$1 38	9	303	\$1 38	8	245	10
							234	11

*Including Station Agents, also Telegraph Operators.

TABLE No. 27.

Showing the Number, Daily Wages and Hours of Work of the Bridge Tenders and Pumpmen and Painters of the Railroads Operating Within the State of Maryland, for the Year Ending June 30, 1897, as Compared With the Year Ending June 30, 1892.

NAME OF RAILROAD.	BRIDGE TENDERS AND PUMPMEN.				PAINTERS.			
	1892.		1897.		1892.		1897.	
	No.	Daily Wages.	Hrs. Per Day.	No.	Daily Wages.	Hrs. Per Day.	No.	Daily Wages.
Baltimore & Ohio.....	24	\$1 64	.....	24	\$1 64	.....	*412	\$1 51
Penna. System. { Phila., Wilm. & Balto.	.....	.....	.....	.....	.....	.....	45	2 00
{ Northern Central.....	.....	.....	.....	.....	.....	.....	40	1 90
Baltimore, Ches. & Atlantic (R'y Div.)...	4	1 60	10	6	77	12	.....	.....
Western Maryland.....	.....	.....	.....	.....	.....	.....	.....	.....
New York, Phila. & Norfolk.....	2	1 10	.....	.....	.....	.....	1	1 50
Baltimore & Lehigh.....	.....	.....	.....	.....	.....	.....	.....	.....
Baltimore & Delaware Bay.....	.....	.....	.....	.....	.....	.....	1	2 00
Annapolis, Washington & Baltimore.....	.....	.....	.....	.....	.....	.....	.....	.....
Piedmont & Cumberland.....	.....	.....	.....	.....	.....	.....	.....	.....
West Virginia Central & Pittsburgh.....	.....	.....	.....	.....	.....	.....	.....	.....
Cumberland Valley.....	.....	.....	.....	.....	.....	.....	.....	.....
Norfolk & Western.....	.....	.....	.....	.....	.....	.....	2	.....
Annapolis & Baltimore Short Line.....	.....	.....	.....	1	.....	.....	.....	.....
Total.....	30	\$1 45	10	31	\$1 47	12	88	\$1 72
							500	\$1 85
								9

*And Other Shopmen.

TABLE No. 28.

Showing the number, daily wages and hours of work of the Traveling Passenger Agents and Other Employes of the Railroads Operating within the State of Maryland for the Year Ending June 30, 1897, as Compared with the Year Ending June 30, 1892.

NAME OF RAILROAD.	TRAVELING PASSENGER AGENTS.				OTHER EMPLOYEES.				
	1892.			1897.	1892.			1897.	
	No.	Daily wages.	Hours per day.	No.	Daily wages.	Hours per day.	No.	Daily wages.	Hours per day.
Baltimore and Ohio.					\$1 52		852	\$1 48	
Penna. { Phila., Wilm. & Balto.					1 72		887	1 72	
System { Northern Central					1 55		735	-1 55	10
Frederick and Penna.					65		5	65	8
Balto., Ches. & Atlan. (R'y Div.)								62	10
Western Maryland.					1 50		143	1 50	
New York, Phila. and Norfolk.	1	\$3 80			1 35		122		
Baltimore and Lehigh.					1 50		11	1 53	
Baltimore and Delaware Bay.									
Annapolis, Wash. and Baltimore.					1 25		22		
Piedmont and Cumberland.					1 70		16	1 45	10
W. Va. Central and Pittsburg.	1	5 00	10		1 40		6	1 50	10
Cumberland Valley.				1	1 07		5		
Norfolk and Western.									
Annapolis and Balto. Short Line.									
Total.	2	\$4 40	10	1	\$1 36		2804	\$1 35	9

TABLE No. 29.

Showing the Number of Employees of various Kinds of the Maryland Railroads and the Number of Railroads Reporting for 1892 and 1897.

	No. of EMPLOYEES.		Increase.	Decrease.	No. of RAILROADS REPORTING.		Increase.	Decrease.
	1892.	1897.			1892.	1897.		
General officers	60	65	5	.....	12	8	.....	4
Division superintendents	3	22	19	.....	2	5	3	.....
Civil engineers	19	17	.....	2	5	4	.....	1
Master mechanics	10	9	.....	1	7	6	.....	1
Road masters	32	29	.....	3	9	5	.....	4
Clerks	767	928	161	.....	13	9	.....	4
Passenger conductors	243	239	.....	4	13	13	.....	.....
“ brakemen	476	483	7	.....	13	13	.....	.....
“ baggage men	87	86	.....	1	9	8	.....	1
“ engineers	314	326	12	.....	13	13	.....	.....
“ firemen	315	334	19	.....	13	13	.....	.....
Freight and yard conductors	158	140	.....	18	7	7	.....	.....
“ engineers	137	127	.....	10	7	7	.....	.....
“ firemen	148	136	.....	12	7	7	.....	.....
“ brakemen	421	356	.....	65	7	7	.....	.....
Machinists	318	305	.....	13	11	10	.....	1
Wipers	58	82	24	.....	5	7	2	.....
Station agents, not tele. operators	340	303	.....	37	13	12	.....	1
“ also	245	224	.....	21	9	7	.....	2
Tele. operators, not station agts.	307	299	.....	8	10	10	.....	.....
Carpenters	390	318	.....	72	11	8	.....	3
Section foremen	284	238	.....	46	13	13	.....	.....
Section men	2,017	1,803	.....	214	12	13	1	.....
Watchmen	822	638	.....	184	10	11	1	.....
Bridge tenders and pump men	30	31	1	.....	3	3	.....	.....
Painters and other shopmen	88	500	412	.....	4	5	1	.....
Traveling passenger agents	2	1	.....	1	2	1	.....	1
Other employees	2,804	2,642	.....	162	11	11	.....	.....
Total	10,895	10,679	.....	214	.....	.....	.....	.....

TABLE No. 30.

Showing the Average Number of Hours Worked Per Day and the Average Wages of the Various Employes of the Railroads of Maryland for 1892 and 1897.

	AVERAGE NO. OF HOURS WORKED PER DAY.		Increase.	Decrease.	AVERAGE WAGES		Increase.	Decrease.
	1892.	1 97.			1892.	1897. month.)		
General officers.....	9	9			\$249 27	\$257 98	\$ 8 71	
Division superintendents.....					125 16	140 97	15 81	
Civil engineers.....	12				99 49	104 72	5 23	
Master mechanics.....	10	10			108 76	111 27	2 51	
Road masters.....	10	10			78 53	89 34	10 81	
Clerks.....	9	10	1		49 79	48 37		\$1 42
Passenger conductors.....	9	9			3 13	3 23	10	
“ brakemen.....	9	9			1 66	1 59		7
“ baggagemen.....	9	10	1		1 47	1 62	15	
“ engineers.....	9	9			3 49	3 30		19
“ firemen.....	9	9			1 81	1 79		2
Freight and yard conductors.....	10	10			2 98	2 87		11
“ engineers.....	10	10			3 28	3 14		14
“ firemen.....	10	10			1 69	1 71	2	
“ brakemen.....	10	10			1 69	1 72	3	
Machinists.....	10	10			2 26	2 10	4	16
Wipers.....	9	9			1 31	1 35		
Station agents, not tel. operat'rs.	9	9			1 38	1 38		
“ also “.....	10	11	1		1 42	1 25		17
Tel. operators, not station agts.	11	11			1 69	1 53		16
Carpenters.....	10	10			1 94	1 92		2
Section foremen.....	10	10			1 75	1 63		12
Section men.....	10	10			1 23	1 15		8
Watchmen.....	12	10		2	1 36	1 18		18
Bridge tenders and pump men..	10	12	2		1 45	1 47	2	
Painters.....	10	9		1	1 72	1 85	13	
Traveling passenger agents.....	10	10			4 40	2 10		2 30
Other employes.....	10	9		1	1 36	1 35		1

TABLE No. 31.

Showing the Lowest and Highest Rates of Wages Paid by Maryland Railroads to various Employes during the Fiscal Years 1892 and 1897.						
	LOWEST RATE OF WAGES PAID.		Increase.	Decrease.	HIGHEST RATE OF WAGES PAID.	
	1892.	1897.			1892.	1897.
	(Per month.)	(Per month.)			(Per month.)	(Per month.)
General officers.....	\$125 00	\$98 33	.....	\$26 67	\$488 17	\$505 07
Division superintendents.....	54 00	54 00	.....	.....	196 33	196 33
Civil engineers.....	45 00	75 00	\$30 00	.....	175 00	175 00
Master mechanics.....	70 00	76 35	6 35	.....	150 00	150 00
Road masters.....	30 00	36 00	6 00	.....	150 00	150 00
Clerks.....	30 00	37 50	7 50	.....	75 00	58 19
	(Per day.)	(Per day.)			(Per day.)	(Per day.)
Passenger conductors.....	2 40	1 97	.....	42	4 00	3 57
" brakemen.....	1 16	1 16	.....	.....	2 00	1 94
" baggage-men.....	1 00	1 00	.....	.....	2 15	2 15
" engineers.....	2 73	1 97	.....	76	4 50	4 21
" firemen.....	1 25	1 30	5	.....	2 80	2 24
Freight and yard conductors.....	1 90	1 87	.....	3	4 00	3 59
" engineers.....	2 00	2 00	.....	.....	4 14	4 14
" firemen.....	1 00	1 16	16	.....	2 50	2 00
" brakemen.....	1 20	1 16	.....	4	3 20	2 20
Machinists.....	1 90	1 33	.....	57	2 50	2 50
Wipers.....	1 20	1 00	.....	20	1 50	1 98
Station agents, not telegraph operators.....	80	57	.....	23	2 10	2 00
" also telegraph operators.....	1 00	95	.....	5	1 84	1 83
Telegraph operators, not station agents.....	1 10	96	.....	14	3 00	1 95
Carpenters.....	1 50	1 60	10	.....	2 44	2 44
Section foremen.....	1 30	1 25	.....	5	2 50	2 05
Sectionmen.....	97	1 00	3	.....	1 50	1 25
Watchmen.....	1 10	67	.....	43	2 00	1 67
Bridge tenders and pumpmen.....	1 10	77	.....	33	1 64	1 64
Painters.....	1 50	1 51	1	.....	2 00	2 00
Traveling passenger agents.....	3 80	2 10	.....	1 70	5 00	2 10
Other employees.....	65	62	.....	3	1 72	1 72
						\$16 81
						43
						6
						29
						56
						41
						50
						48
						1 35
						45
						25
						33
						2 00
						2 10
						1 72

CHAPTER II.

THE TOBACCO INDUSTRY IN MARYLAND.

EARLY HISTORY.

The use of tobacco was first brought to the knowledge of the civilized nations on the discovery of America by Columbus in 1492, when it was found to be in use by the natives as far north as Virginia and Maryland. Comparatively little notice was taken of this plant until about 1650, when it entered largely into the trade of the American colonies with Europe. The culture of tobacco in Maryland was taken up by the early colonists, who followed in the footsteps of their Indian predecessors, and by the introduction of new and improved methods in the management of the plantations soon made the plant the staple product of the colony.

In 1632, Charles I, granted to Sir George Calvert, (who about this time was made Lord Baltimore,) the territory now known as Maryland. In 1633, Lord Baltimore sailed from England with two hundred persons and settled in his new possessions. The colony from the first prospered far better than the colony of Virginia, and soon laid the foundations of a strong and substantial government. Like the Virginians, they engaged in the cultivation of tobacco, which seemed as well adapted to the soil as the other products, corn and English wheat.

From this time the colony developed into strong and flourishing plantations, and with each succeeding year increased the cultivation of tobacco, until it exceeded all other products combined. Its culture was looked upon with disfavor by Charles II, who confirmed the old laws against its sale and cultivation. But notwithstanding the opposition of the Stuarts, the plant grew in use and favor, and could not be uprooted even by a kingly hand, and the planter supplied with greater facilities for the work, now increased the size of their plantations by "taking up" new ground, (clearing the land,) and planting a much larger area. The first exportation of the colony's tobacco was brought into competition with that of much finer flavor, which had acquired an established reputation long before the English began the culture of the plant in the new world. The Spanish, Dutch and the Portuguese had long monopolized its culture and trade, and

carried to Europe from St. Domingo, Jamaica, St. Thomas, the Philippine islands and various parts of South America several varieties of tobacco, which sold at exorbitant prices. On testing the Maryland tobacco in London, it was found to be sweet and mild in flavor, of a light color, and well adapted for smoking. On its first introduction in England, it sold for three shillings per pound, but as its culture increased the price lessened, until it was sold at one-half of this amount.

From this time on, the cultivation of the plant increased at a marvelous rate, resulting in a great impetus to the prosperity of the State and the amassing of large fortunes by many of the planters, who lived in a princely style and dispensed a lavish hospitality, which is being emulated by their descendants to this day.

As early as 1758, in one year, Maryland exported nearly 40,000 hogsheads, the freight alone, on this, amounting to £60,000 or about \$300,000, the rate being thirty shillings per hogshead of 1,000 pounds each.

As an interesting feature, and as showing to what extent the traffic had grown in the days of our forefathers, the following table is given. It is an exhibit of the entire amount exported from the United States from October 1, 1791, to September 30, 1792, showing the shipments from each State:

	Manufactured.	Hogsheads.
New Hampshire.....		3
Massachusetts.....	110,525 pounds.	1,221
Rhode Island.....		1,429
Connecticut.....		105
New York.....	1,600 pounds.	1,952
New Jersey.....		5
Pennsylvania ..	2,140 pounds.	2,203
Delaware		8
Maryland.....	780 pounds.	28,892
Virginia	2,025 pounds	61,203
North Carolina...		3,546
South Carolina.....	624 pounds.	5,290
Georgia	180 pounds.	5,471
Total.....	117,874 pounds.	112,428

In 1891, one hundred years later than the above, the shipments of tobacco from Maryland alone, amounted to 45,603 hogsheads. Further on in this article statistics will be

given of the tobacco interests in the State. In the meantime a few facts in reference to the cultivation of the plant may prove interesting.

CULTURE OF THE PLANT.

Tobacco requires a large amount of care throughout its growth, and an equal solicitude to insure its safety from damage, when sent to a distance, for the use of a consumer. In the outset, it is necessary to secure the best land for its cultivation, and that land is soon impoverished by the plant, if it has not the adjunct of a good fertilizer. The seed is usually set in beds of made soil, enriched with wood-ashes and other manures. March or early in April is the period chosen for placing the seed in the beds, where the young plants remain until May or June, carefully protected against frosts; when the leaves have grown to the size of a dollar, and four or five appear, they are then transplanted into the tobacco field, a day of warm rain being selected for the purpose. The field is hoed into rectangular hollows, with small raised hillocks between each. The young plants are then drawn from their native bed and brought in baskets to the field, one being laid on top of each mound of earth. The planter then makes a hole in the centre of each hillock with his fingers, and having adjusted the plant in its natural position, presses the earth gently around the roots with the hand. The field requires constant care to prevent the growth of weeds, and the plant in its early stages is liable to injury from the attacks of insects, a description of which follows:

INSECT ENEMIES.

Among these are the *Protoparca celeus*, the northern tobacco worm, and the *P. carolina*, the tobacco worm of the Southern States. The adults of these insects, called sphinx-moths, are strong, rapid flyers, and at twilight are often mistaken for humming birds. The eggs are deposited singly on the tobacco leaves, where they soon hatch.

The larva, known as hornworm, is a voracious feeder, and does great damage, particularly to the varieties of tobacco used for cigar wrappers. The larva burrows in the ground to pupate, where it moults and becomes a chrysalis and remains in the ground in this state until the following spring. The late broods of this insect feed almost wholly on the tobacco plant. Hand picking the worm is the chief remedy, although attempts to poison the adult insect have

often proved successful. Greasy cutworm (*agrostis ypsilon*), one of the commonest of American cutworms, feeds also on corn, cotton and other plants. The eggs are laid on weeds or grass, and hatch out in a day or two, the larvae drop to the ground, burrow and feed on roots until the following spring, when they come to the surface of the ground, and often do great damage by eating off the young plants; the damage is done almost wholly at night. The flea beetle or tobacco-fly (*Crepidodera cucumeris*) lives through the winter in a winged state, and attacks the young plants in the seed bed and in the fields soon after transplanting. The remedies, are covering the beds with netting and sprinkling the plants with a decoction of tobacco water. The boll worm (*Heliothis armigera*), sometimes damages tobacco, when corn and cotton are scarce; the only remedy is hand-picking the larvae. The meadow grasshopper (*Orchelimum vulgare*), and the locusts, of which there are several varieties, (*Melanoplus femur-subrum* is the most common,) all do more or less damage, particularly if the tobacco fields are near pasture or meadow land.

DISEASES.

The tobacco plant is subject to comparatively few diseases, and these rarely result in serious damage. The brown-rust prevails to a greater or less extent every year, and is caused by an abnormal physiological condition of the leaf structure, caused by excessive wet or drouth, or any cause that produces a weak growth. The white speck of tobacco is supposed to be caused by the fungus *Macrosporium tabacum*, although its history is not well understood. White veins occur in the cured product and have been attributed to a variety of causes.

TOPPING.

The next operation is that of "topping" the plant which prevents the leading stem from running up too quickly to flower and seed, and so starving the leaves; to prevent this, the top is nipped off with the thumb nail, (a knife is sometimes used) which is considered better than instruments, because it partially closes the wound and does not allow the plant to bleed. The custom is to "top" the plant to nine, seven, or five leaves, according to the soil and the strength of the herb, the result insuring large, well grown leaves.

SUCKERING.

The next operation is done four weeks after the preceding one. It is termed "suckering," and consists in removing the suckers or shoots, which now make their appearance at the junction of the leaves and about the roots of the plants, the result of that vigorous growth retarded by the "topping" process, and which, if allowed to continue, would injure the proper development of the tobacco leaves, the great end the planter has in view; he therefore removes all these off-shoots with the thumb-nail as in the previous process.

FIRING.

During very rainy seasons, and in some kinds of unfavorable soil, the plant is subject to a malady called "firing." It is a kind of a blight produced by the moist state of the atmosphere or of the ground in which the plant grows; it is also liable to the extremes of heat or drought. The injury is much dreaded by the planter, as it marks the leaf with a hard brown spot, which perishes and produces holes fatal to the value of the crop.

HARVESTING.

The leaves as they ripen become rougher and thicker, assume a tint of yellowish green, and are sometimes mottled with yellowish spots. The crop being ready for gathering, the planter is careful to secure it before autumnal frosts occur, for the plant is among the first to feel their injurious influence. Judgment is also required in cutting the plants, and this operation is assigned to the best and most judicious hands employed in the culture. Each person so employed, being provided with a strong, sharp knife, proceeds along the respective rows of plants and select only such plants as appear fully ripe, leaving the rest a short time longer. The stem of each plant is severed as near as possible to the ground, and such plants as have thick stems are divided longitudinally, to admit the air and dry them quicker. The plant is then laid gently on the ground, so that the leaves be not damaged, and is allowed to remain exposed to the rays of the sun through the day or until the leaves are entirely "wilted," as it is termed; that is, till they are flaccid and will bend any way, without breaking.

CURING.

The leaves are dried in houses, where free ventilation is secured. They are often constructed of logs of timber, the

edges of each one resting at right angles on its neighbor, by which means thorough draft is secured. In about a month the leaves will be thoroughly dried. Should the weather be wet, as the plant is so easily affected by the humidity of the atmosphere, artificial aid must be ensured by smouldering fires of rotton wood, made on the floor of the drying house. Sometimes another process precedes this, termed "sweating the tobacco," when the leaves are laid on the barn floor, and allowed to partially ferment, being turned every twenty-four hours, so that they all fare alike. The longer they thus lie the darker they grow. They are then hung on the poles, to be entirely cured.

PACKING AND REMOVAL.

The plant is said to be "in case," or in proper condition for packing and removal, when the leaves are dry enough to bear handling, and have a certain elasticity, which is tested by stretching them gently over the ends of the fingers and knuckles, and they pull like kid leather, glowing with a kind of moist gloss, not dry enough to ferment. They are now unhung from the poles, and the leaves stripped from the main stem, are gathered in small bunches, termed "hands," each of these is tied round at the base of the stalks with another leaf, making a kind of bandage. They are then packed upon each other in regular rows, to dry sufficiently to be placed in the cask. It will thus be seen from the first planting of the seed to the ultimate packing of the dry plant for exportation, it is a constant solicitude to the planter.

A Maryland tobacco hogshead contains from 600 to 850 pounds, and the small bunches being put in, in layers close to each other across the hogshead, with the points of the leaves all laid one way; the next course is reversed, with the points in an alternate direction, and the interstices are filled up with smaller plants, so that a general even surface be presented. The hogshead being about one-fourth full, the whole is subjected to strong pressure until it is reduced one-half its bulk; then another similar layer is placed upon it, again squeezed, and succeeded by as many as are required to fill the cask, which is then ready for shipment to market.

The product of the Maryland tobacco plantations is principally used for smoking purposes, and is highly esteemed abroad, especially in Holland, France and Germany, in which countries the governments hold a monopoly of the trade, and by this means realizes a handsome revenue. Tobacco is

grown more or less in a number of the counties of the State, but the section producing the great bulk of the staple, comprises Anne Arundel, Prince George's, Charles, St. Mary's and Calvert counties, and the product is all sent to Baltimore, either by rail, steamer or sailing vessel, for sale and shipment.

It was desired to give the production of each county separately, but as no such record is kept at the several warehouses, it is impossible to do so, but to show the relative production of the following, figures are given from the census of 1880 and 1890, the latest available data:

ACREAGE AND YIELD PER ACRE IN TWO CENSUS YEARS, TENTH AND ELEVENTH CENSUS.

	1879. Acres.	1890. Acres.	1879. Pounds per Acre.	1889. Pounds per Acre.
St. Mary's.....	5,528	2,904	801	847
Anne Arundel...	6,271	3,750	708	562
Calvert.....	6,818	3,683	568	484
Charles.....	7,913	3,651	650	552
Prince George's.	9,637	5,322	632	603
Montgomery....	1,053	460	765	730
Baltimore.....	12	11	800	1,241
Cecil.....	43	1	1,373	1,100
Harford.....	52	154	1,309	1,067
Carroll.....	162	60	847	917
Howard.....	208	115	668	797
Frederick.....	429	162	864	760
Total	38,174	17,966	683	688

HANDLING IN BALTIMORE.

Upon reaching Baltimore the tobacco is placed in the State Tobacco Warehouses, of which there are five in the city as follows: Nos. 1 and 2 at the foot of Long Dock, and Nos. 3, 4 and 5 on each side of Conway street, between Light and Charles streets.

When a consignment reaches one of the warehouses, it is first appropriately numbered and lettered, the names of the owner and consignee being already marked on each hogshead.

The next operation is that known as "breaking," which consists of removing the hoops, staves and heads of the hogsheads, which leaves the tobacco standing on the floor in the exact shape of the hogshead. Six "breaks" are made at regular intervals, and a sample taken from each place and given to the consignee, who then sells the lot by the said

samples. The hogshead is then re-coopered, marked with the grade with which it passed, and if desired, it is placed on storage in the warehouse.

When placed on storage, notes are issued to the consignee or commission merchant. When he wants to remove it, he returns the notes and the tobacco is delivered to him. No fee is charged for inspection, nor is storage exacted until the expiration of six months. This storage is never paid by the planter, but by the consignee.

The crop for 1897 has practically all been received at the warehouses in Baltimore, inspected and stored.

At No. 1 warehouse on Long Dock, of which Mr. William F. Ford is Inspector, there had been received from January 1st, 1897, to October 1st, same year, 9,997 hogsheads. At this warehouse the average number of men employed, including the officials and clerks, is twenty-five.

No. 2 warehouse, adjoining No. 1, owing to a falling off in the trade, is not now in use by the State, but is under lease to the Northern Central Railway Company for other purposes.

Warehouses Nos. 3 and 4, Light and Conway streets, are consolidated and are in charge of Inspector Joseph S. Sunderland, who employs an average force of twenty-five men. The receipts from January 1st, 1897, to October 1st, 1897, amounted to 11,500 hogsheads.

No. 5 warehouse, corner of Charles and Conway streets, is in charge of Inspector John D. Gaither, who has under him a force which averages thirty men. The receipts at this warehouse for the above named period were 11,166, making the total receipts of Maryland tobacco at the Baltimore warehouses from January 1st, 1897, to October 1st, same year, 32,663 hogsheads.

The subjoined table gives the annual receipts and inspections at the State warehouse since 1880.

Year.	Hogsheads.	Year.	Hogsheads.
1880.....	36,871	1889.....	26,175
1881.....	27,720	1890.....	14,027
1882.....	35,891	1891.....	27,336
1883.....	33,105	1892.....	22,433
1884.....	35,149	1893.....	26,863
1885.....	32,649	1894.....	40,172
1886.....	41,081	1895.....	32,563
1887.....	37,064	1896.....	34,001
1888.....	32,174	1897.....	32,563

CASH RECEIPTS.

The cash receipts of the several warehouses belonging to the State at Baltimore, average annually about \$70,000 in

round numbers, from "outage" fees, (of \$2 per hogshead,) storage, etc., and are more than self sustaining, a handsome balance, running from \$5,000 to \$7,000 being turned into the State treasury after all expenses, including salaries, wages, etc., are paid. The relative difference between the receipts and expenses is however maintained, as in dull years the working force is correspondingly reduced.

EARLY INSPECTIONS AT BALTIMORE.

Baltimore, way back in colonial times, was a great tobacco mart and shipping port. Annapolis also came in for a handsome share of the trade in those days. Bladenburg and Elkridge Landing, both now practically inland towns, also did a thriving trade with the mother country direct, but in vessels which in these days would look like rowboats along side of the ocean leviathans which now perform the ferryage across the ocean.

In 1750, a house for the inspection of tobacco was erected on the west side of Charles street, near the head of the inlet into which Uhler's spring emptied. At the same time a public wharf was built at the south end of Calvert street, and was, for a long time, known as the County wharf.

In 1763, a new inspection warehouse was erected on Thomas Harrison's grounds, the spot now being the southwest corner of Lombard and South streets. An inspector was appointed for this warehouse at an annual salary of 9,600 pounds of tobacco.

Tobacco at that time, however, was not bringing the price it does at the present day, as we are told that about that date tobacco was a legal tender, at the rate of a penny a pound.

In 1801, James Calhoun erected an inspection warehouse at Pratt and Light streets; in 1803, another was erected. In 1820, one was erected on Light Street wharf, and in 1823, William Patterson built one on his wharf, near Commerce street.

EXPORTATIONS.

Maryland tobacco, shipped abroad, is bought by the consuls of the various countries, which use it, at market rates. The French and German governments, however, generally contract for it with some responsible firm at Baltimore, and this has been and is a great source of profit to the merchant, and at the same time a stimulus to the commercial activity of the port. The deepening of the harbor of Baltimore and its

approaches, and the frequent sailings of the splendid steamers of the North-German Lloyd and the Holland steamers, have all been great factors in fostering and increasing this trade. The contract of the French government with G. A. Von Lingen & Co., of Baltimore, for Maryland tobacco, amounts to 11,000 hogsheads.

The selling price of Maryland tobacco for 1897 has ranged from 1 cent per pound to 18 cents per pound, but the average has been from $6\frac{1}{2}$ to 7 cents per pound.

The following figures show the exports of Maryland and Ohio, from Baltimore, in the year 1896, the latest available data:

Country.	Hogsheads.
To France.....	11,948
Holland.....	14,009
Germany.....	4,871
Belgium.....	216
North Europe.....	104
Total.....	31,148

Of the above, Maryland tobacco forms by far the greatest part, there being only 1,000 hogsheads of Ohio, included.

The exports of 1897 did not vary materially from the above, there being no change in the foreign contracts, although there was a slight increase in the total amount exported.

PROSPECTS OF THE INDUSTRY.

The chief cause leading to a falling off in the tobacco production of the State in recent years is that the tobacco producing area has greatly increased in the United States and abroad, that the Maryland grade meets with much wider competition, and the market demands themselves have so changed as to quality, etc., that the industry is not what it was in the olden times.

Efforts are now being made, however, to introduce other varieties to meet the higher market demands, with every prospect of success. If so, it will give a stimulus to the culture of the plant in localities where the conditions are adapted to producing a mild fine texture and light colored leaf. Then the southern section of the State, bounded on the east by the Chesapeake and on the west by the Potomac, will in the near future, be devoted almost exclusively to

tobacco, fruit and truck farming, the latter being profitable and the conditions being exceedingly favorable, especially the nearby markets of Baltimore and Washington. A projected railway from Washington through this section to the bay shore, seems now to be an assured fact, and promises to do much for the development of Southern Maryland, which hitherto has suffered greatly from the want of railroad facilities.

MANUFACTURED TOBACCO.

Baltimore has always been one of the leading markets for manufactured tobacco. Its close proximity to Virginia, Ohio, Kentucky and other sections noted for the best tobacco has been of great advantage to the city in this respect. Thus located, Baltimore commands a large portion of this trade, and the commission and jobbing trade is enabled to carry large stocks, while the forwarding facilities by rail and water are unsurpassed. There are several immense factories for the manufacture of smoking tobacco and snuff; the brands they put on the market having gained an enviable reputation in the United States and Europe. Numerous factories are engaged in the manufacture of cigars, and their superior quality has gained them great popularity at home and throughout the country. The cigarette industry has of late years greatly increased, and many persons gain a livelihood in putting up tobacco in this apparently seductive shape.

According to the figures obtained from the United States Internal Revenue Office in Baltimore, there are 800 tobacco factories in the State, of which there are located in Baltimore alone, 650. These figures embrace all kinds of factories, from mammoth smoking tobacco and cigar factories down to the humble dealer who manufactures his own stock.

CHAPTER III.

BALTIMORE.

Baltimore, the metropolitan city of Maryland and of the South, is admirably located for the purposes of trade, commerce and manufacturing, and her enterprising citizens, since the foundation of the city or town as it then was, have been distinguished for their energy, enterprise, liberality and business foresight. Long before the days of steam transportation they had built up a large commerce with foreign countries. In those days the products of the South, West and near-by points were brought to the city by the teamsters, who drove many weary miles from the borders of the Ohio river to reach a market, carrying back with them a rich return cargo of what was then the luxuries of civilization. From the lower counties of the State, as well as from Virginia, North Carolina and Delaware, produce was brought to Baltimore for shipment in the various types of sailing vessels of those times.

As flourishing and prosperous as the trade of the city then was, it sinks into insignificance when compared with the great increase which has marked the advent of steam-power, as an adjunct to the prevailing methods of transportation. First, the steamboat revolutionized things by quick and regular trips to the contiguous territory in Maryland and Virginia waters, bringing products here, to be shipped abroad in the fast-sailing Baltimore clippers.

The greatest piece of enterprise, however, which has marked the history of Baltimore, is the inception and construction of the Baltimore and Ohio Railroad, which, while it added immensely to the prosperity, population and business of the city, gained for it a world-wide celebrity as the projector of the first trunk line in the world, and gave to Baltimore an *eclat* which has been of immense advantage ever since. From the time that this road reached the rich coal fields in the western sections of Maryland and Virginia, Baltimore's boom began and has continued until the present day, when it holds, according to the U. S. Census, the rank of the seventh city of the Union as regards population, and possesses many advantages, both natural and otherwise, which will appear under their appropriate headings in this article.

CLIMATE.

The climate of Baltimore is all that could be desired. It has neither the extreme heat of the South, nor the cold of the North, but preserves a happy medium between the two, rendering it a delightful place of residence all the year round. In winter the thermometer rarely drops to the zero point, and in summer there are but a few days that it marks over ninety degrees. The mean temperature of the city during the seasons of the year in Baltimore, as obtained from the United States Weather Bureau is as follows:

Spring, 50.6; summer, 73.5; Autumn, 54.3; Winter, 33.1. The rainfall by inches since 1883 has been as follows:

1883.....	40.52	1890.....	46.96
1884.....	45.88	1891.....	54.21
1885.....	46.04	1892.....	45.05
1886 ..	53.11	1893.....	32.15
1887 ..	43.59	1894.....	38.24
1888.....	41.53	1895.....	40.47
1889.....	62.35	1896.....	38.59

Baltimore's mild and equable climate, coupled with its transportation facilities, makes it the headquarters for the luxuries of both land and water, and there are but few known delicacies that cannot be found in her markets, which have attained a world-wide fame. Dickens and other celebrities from abroad, who, while in Baltimore, tasted Maryland oysters, terrapin and canvas backs, have, in their writings, helped to swell our city's fame as a purveyor to Epicurean tastes.

ALTITUDE.

The greater portion of Baltimore occupies a respectable elevation above tide-water, which carries with it the accompanying advantages of purer air, partial natural drainage, &c. The following are the elevations of some of the highest points in the city and annex, furnished by the City Topographical Survey. They have been arrived at by the most careful calculations, and are perfectly correct. The height along Light-street wharf, and in fact all along the water front, averages about from 5 to 6 feet above tide-water. The other elevations are:

LOCATION.	No. Ft.	LOCATION.	No. Ft.
Garrison and Oak Avenues, (Arlington,) highest point...	460.0	Charles Street Avenue, oppo- site Abell's gate.....	271.8
Clifton Mansion.....	207.5	Druid Lake.....	225.0
Johns Hopkins Hospital.	110.0	Mansion House.....	320.
Base Washington's Monument.	100.0	St. Joseph's Monastery.....	2250
High Service Reservoir, Druid Hill Park.....	350.0	North Avenue and Payson Street.....	233.8
Mt. Royal Reservoir.....	160.0	Loudon Park Cemetery.....	220.0
Hampden Reservoir.....	225.0	Cathedral Cemetery.....	310.0
Lake Montebello.....	170.0	Walbrook.....	335.0
Lake Clifton ...	170.0	Epiphany College.....	335.0
Presstman and Gilmor streets..	220.0	No. 13 Engine House....	180.0

The territory immediately adjacent to the city rises to still greater elevations, and is of most picturesque description. Indeed, Baltimore has long been noted for the beauty of its suburban surroundings; and what nature has left undone, art has in large measures supplied by the erection of hundreds of elegant villas, cottages, and other cosy residences. This result has been brought about in large measures by frequent suburban trains and trolley lines, together with the admirable pikes and other drive-ways which approach the city.

STREETS.

Baltimore has within her borders a total of 780 miles of streets. In the older portions of the city some of these follow the routes of the old country lanes and roads (notably in Old Town) and are consequently narrow and crooked. This is a disfigurement, which has been largely remedied in the past, and which in the course of a few years, as the city grows, and the needs of travel increase, will probably be entirely obliterated. In the newer sections of the city, particularly in the western and northern sections, the streets have been laid off, of a good width and at right angles, making handsome thoroughfares. Cobble stone, belgium block, sheet asphalt, asphalt blocks and vitrified bricks have been used as paving material. The wheelmen have recently become quiet an element in our population and are making strenuous efforts for smooth streets, that it looks as though in a few years, that their influence will be sufficient to secure ideal roadways throughout the greater portion of the city. Baltimore has the same mileage of streets, as did New York before it became a portion of the "Greater New York."

Under the head of streets, the lighting of the city at night can be appropriately described. There are now in use in the first twenty wards of the city proper: 1,229 electric arc

lamps, 5,083 gas lamps, 327 gasoline lamps, and in the twenty-first and twenty-second wards, annex, 39 electric are lamps, 845 gas lamps, 653 gasoline lamps.

The electric lights are furnished the city by contract at 35 cents per lamp per night. Gas costs the city \$1.25 per thousand feet, and the gasoline lamps cost \$12.07 per lamp per annum. The cost of lighting the city and annex in 1896, was as follows:

Electric lights, - - -	\$165,991 33
Gas lamps, - - -	148,207 48
Gasoline lamps, - - -	14,237 37
Salaries—Superintendents, clerks, lamplighters, etc. - - -	72,216 15
Total, - - -	<hr/> \$400,652 33

There are 147 lamplighters in the city and annex, each of whom is paid a salary of \$8 per week. Each man has a beat similar to that of a policeman, and has to light, extinguish and keep in order all the lamps under his charge.

The system of lighting the streets of Baltimore, every night in the year, (there being no "corporation moonlight" these days,) is an admirable one, and well carried out, and as a result, Baltimore is one of the best lighted cities in the country.

WATER SUPPLY.

Baltimore can justly lay claim to having a supply of this indispensable fluid, second to no city in the country, either in purity, abundance and storage, and distributing capacity. The introduction of the Gunpowder water several years ago contributed largely to this end.

The great conduit which leads from Loch Raven, on the Gunpowder, to lakes Montebello and Clifton was built at a large expenditure of money and time, and the water comes to the above named lakes by natural flow, no pumps or other artificial adjuncts being necessary. It was built under the superintendency of the late Major R. K. Martin, and is considered a marvel of engineering and mechanical skill. It is a fitting monument to his untiring energy and ability.

There are eight reservoirs connected with the system, with a capacity of 2,310,000,000 gallons. The daily consumption of water in the city is about 60,000,000, while the capacity of the works for daily distribution is 300,000,000. It will

thus be seen that at present the city is only using about one-fifth of the actual supply. Moreover, the reservoirs hold nearly a two months' supply, a very important consideration in times of drouth, and Baltimore need have but slight fears of a water famine at any time.

Every effort is made by the State Board of Health to preserve the purity of the water supply, as a thing paramount and of vital importance to the residents of the city. Daily inspections of the water-sheds of Jones' falls and the Gunpowder river (the sources of supply) are made, and any nuisances tending to contaminate the supply, is promptly abated.

With practically inexhaustible supply, the city is now engaged in the work of giving greater facilities to consumers, both in the annex and in the old twenty wards. This proposes the extension of the mains in portions of the annex now unreached; and the reorganization of the mains in the old twenty wards. It was for this purpose, that the \$2,000,000 loan of 1945 was effected. The contract for the necessary pipes has been made, and the work is going on in various parts of the city.

Water is furnished to consumers at rates in accordance with the size of the house and the amount used. Landlords pay the water rates, and it is included in the rental paid by the tenants. The water used in large manufacturing establishments is measured by meters, and is charged for by the thousand gallons. All newly erected houses in Baltimore are compelled by law to have bath-tubs, and the city makes no charge for water used for this purpose.

A movement for free water was made several years ago, but it failed. It has again been brought forward, and will probably be a cause of discussion in the city council at an early date. The receipts by the city for water rents, in 1896, were, \$789,532.01.

HEALTH.

That Baltimore is an exceptionally healthy city is shown by the records of the Health Department. The last reports shows a death rate for the whites of 17.66 per thousand of population and 30.76 for the colored, the rate for the whole population being only 19.60. This is a comparatively low rate, yet the officials are of the opinion that the adoption of more effective measures for the protection of the public health would unquestionably reduce even the above low rate. The ratio of deaths of children under five years of age to the

total number of deaths was 37.58 per cent.—a reduction of 1.45 per cent. from the preceding year. A prominent cause leading to the small death rate in Baltimore is the fact that there is but comparatively little of tenement life here, Baltimore being in this respect pre-eminently “a city of homes.” This is illustrated by the fact that in the city and annex there are upwards of 107,000 dwellings and an estimated population of 525,000 persons, which averages about five persons to each house. The most populous ward in the city is the seventh ward, which has 9,717 dwellings and 32,235 inhabitants. The sixteenth ward has the smallest population, viz: 16,401 persons and 2,533 dwellings. The twentieth ward has the lowest death rate, viz: 14.37 per cent. per thousand, and the ninth ward the highest, viz: 30 per cent. Another factor which will contribute materially to the improvement of the health of the city, and a consequent decrease in the death rate, is the projected sewerage system, which doubtless ere long will form a part of the public improvements of the city. When this great work shall have been completed and every house in the city connected with its appropriate sewer, Baltimore will enjoy a well nigh perfect system of underground drainage. The outlets to the system will be a sufficient distance down the river to be carried away by the tide, and thus waters in the harbor will be purified and cease to be an offense and a subject of reproach as at present. Such a system, aside from its manifest sanitary advantages, would doubtless prove a source of considerable revenue to the city.

EDUCATIONAL.

The people of Baltimore have very great reason to pride themselves on the number and excellence of the educational establishments, both public and private, in their midst. The Johns Hopkins University heads the list. Founded by the munificence of him whose name it bears, it steadily progressed in usefulness and influence from year to year, until its fame has become world wide, at the same time giving due prominence to the city where it is located. The opinions and dissertations of its corps of learned professors are eagerly sought for and have much weight in the literary and scientific world. There is also the Woman's College in the northern annex, one of the most beautifully located, handsomely constructed and best conducted institution of its kind in America. There are numerous others of not such imposing pretensions, yet at the same time they are excellent insti-

tutions of their class and afford every facility for obtaining an education. The University of Maryland, School of Law and Medicine; the College of Physicians and Surgeons; the Maryland General Hospital; the Baltimore University of Medicine, (on Bond street); the Baltimore College of Pharmacy; the Baltimore Dental College; the law school and other institutions offer exceptional facilities for obtaining thorough professional education. In the case of the medical colleges, the large hospitals attached, with their numerous cases of every description, offer to the student an opportunity for practical demonstration of the physician's and surgeon's art but seldom afforded. Students from abroad can obtain excellent home-like accommodations and at reasonable rates and at convenient distances.

The public school system of Baltimore has been for years noted for its excellence and the thoroughness of the instruction imparted, from the primary grade to the city college and female high schools. Some years ago a nominal charge was made for tuition in the public schools, but that has been since abolished, and they are now absolutely free, books also being furnished gratis. In the female schools the pupils are taught sewing in addition to their regular studies, and many of the scholars have become quite proficient in the use of the needle, an accomplishment that cannot fail to be of benefit to them in after life.

At the Polytechnic Institute, in addition to their other studies, which are of an advanced nature, the boys are given a course in tool instruction, including carpentering, wood-carving and turning, pattern-making, moulding, soldering, brazing, vise and machine-shop work, and the care of steam engines and boilers. Upon graduating, should a student desire to follow up either of the above-named branches of industry, he will have acquired a practical knowledge which will be of incalculable advantage to him in the final acquisition of his trade. The average attendance at this school is about 500 daily during the school term. At the city college and the female high schools the studies are of an advanced grade, and the graduates are entitled to be chosen teachers without the customary examination.

There are seven English-German schools in the city, where the pupils are taught both the English and German languages. The attendance in these schools is about 9,000, and they are generally crowded, as many parents are anxious that their children shall obtain a knowledge of the German language.

The last annual report of the school board shows that the total attendance of pupils was 65,787, under the charge of 1,978 teachers, of which number 63,087 were in the day schools and 2,700 in the night schools. The total number of schools of various grades was 188, and the cost of maintaining them, including building and repairs was \$1,386,858.03. The estimated cost of the maintenance of the schools for 1897 is \$1,309,888. The total value of school buildings is \$2,159,959.01, and of lots \$459,412.07, making a total value of buildings and ground of \$2,619,371.08.

FIRE DEPARTMENT.

For means of fighting the devastating element of fire, Baltimore is as well equipped as any other large city in the country, and the small average annual loss fully corroborates this assertion. The fire department consists of twenty engine companies, all equipped with modern steam fire apparatus, and manned by 237 men; seven chemical engine companies (located in the annex,) manned by twenty-two men and ten hook and ladder companies, manned by eighty-five men. These, with ten probationary firemen, twenty-one disabled firemen specially employed, the chief engineer and six assistants, and the superintendent of machinery, makes a total of 383 men employed in the active service of the department. The last annual report of the Fire Board shows that the cost of maintaining this force for the year 1896 was \$417,170.82. The report also shows that during the said year there were 720 alarms from street and automatic boxes and 265 silent alarms. During the year there were but thirteen fires at which the loss exceeded \$5,000; the losses for the year being in the city \$275,137.59 and in the annex \$34,897.81, making a total loss for city and annex of \$310,035.40.

In addition to the regular engine and hook and ladder companies in the city the department maintains a harbor fire-boat, the "Cataract," which is one of the finest of her class in the country, and is of inestimable service during the progress of fires along the water front. She is equipped with one fire pump, capable of throwing a four-inch stream, and a number of effective streams of lesser diameter. The firemen composing the Baltimore department are second to none in the country, as has been well tested by their bravery, courage and efficiency on many a well-fought field.

The paid fire department of the city was established in the latter part of 1858, and the following table of losses since that time may not be uninteresting:

YEAR.	NO. OF FIRES.	LOSSES.	YEAR.	NO. OF FIRES.	LOSSES.
1859....	98....	\$350,000 00	1878....	371....	\$162,312 78
1860....	112....	310,000 00	1879....	306....	192,654 54
1861....	115....	60,000 00	1880....	343....	580,290 09
1862....	130....	83,000 00	1881....	324....	454,773 35
1863....	138....	120,482 33	1882....	358....	330,113 84
1864....	143....	163,528 49	1883....	399....	561,520 00
1865....	163....	71,358 00	1884....	388....	617,871 79
1866....	178....	181,115 00	1885....	474....	441,743 06
1867....	193....	293,045 00	1886....	430....	896,527 12
1868....	145....	76,244 75	1887....	496....	1,162,359 26
1869....	187....	398,259 09	1888....	602....	1,272,478 82
1870....	203....	432,717 07	1889....	545....	477,329 07
1871....	226....	475,391 00	1890....	594....	441,152 65
1872....	245....	300,000 00	1891....	676....	650,009 73
1873....	265....	892,628 58	1892....	795....	839,435 77
1874....	384....	506,826 15	1893....	829....	1,153,129 76
1875....	348....	608,351 30	1894....	831....	542,188 29
1876....	332....	563,248 78	1895....	816....	730,751 11
1877....	420....	438,715 57	1896....	985....	310,035 46

Showing the total loss in thirty-eight years to be.....\$18,141,587.54.

The table shows that in thirty-eight years there was an average loss of less than a half million dollars per annum, which speaks volumes for the efficiency of the Fire Department, and at the same time shows that insurance companies' risks are not as heavy as one would at first glance be ready to suppose in a city of the size of Baltimore. In connection with the above table and accompanying remarks the following table will be further witness to the efficiency of Baltimore's Fire Department:

CITY.	Area Sq. Miles.	Populat'n	En- gine Co's.	Hook and Ladder.	Chemi- cal Co's	Mem- bers.	Fire Plugs.
New York.....	64	2,000,000	64	22	4	1,175	10,569
Chicago.....	187	1,750,000	81	26	20	1,131	17,000
Philadelphia.....	129½	1,888,800	46	9	28	743	10,038
Brooklyn	76	1,140,000	49	24	1	855	7,500
St. Louis.....	62½	625,000	35	11	1	469	5,250
Boston.....	37	500,000	43	17	12	744	7,220
Cincinnati.....	36½	355,000	27	10	2	323	2,446
San Francisco....	40	310,000	25	13	9	644	2,344
Pittsburg ...	28	284,000	26	7	2	311	1,973
New Orleans....	38	300,000	26	7	10	300	1,300
Louisville	13½	185,000	14	6	.....	162	760
Baltimore	33	540,298	20	7	10	362	1,827

PARKS.

Baltimore city and annex occupy 31½ square miles of territory, or 20,160 acres, and of this amount 2,955 acres are comprised within the various parks, public squares, etc. But

few cities in the country are blessed with the park facilities possessed by Baltimore. Druid Hill Park is celebrated for its magnificent natural beauty, as well as for its artificial adornments, and it is always a place of interest and pleasure to visitors to the city. There is contained within the area of this park 672 acres. The other parks of the city, although not approaching Druid Hill in size, all of them possess many advantages of situation, elevation, view afforded, shade, beauty of arrangement and the admirable manner in which they are kept. They form oases or breathing spots in the desert of brick and mortar which are duly appreciated by the thousands to whom they are a priceless boon. The parks of Baltimore with their acreage, are as follows :

PARKS.	ACRES.
Druid Hill Park.....	672
Clifton Park.. ..	253
Patterson Park.....	106
Carroll Park	19
Riverside Park.....	17
Canton Park.....	11
Federal Hill Park.....	8

In addition to the above named parks there are numerous well kept and shaded public squares throughout the city which form admirable play grounds for children and places of rest for their elders. Eutaw Place, North Broadway, Fulton Avenue, Mount Royal Avenue, and other streets throughout the city are parked in the centre, with pleasing and picturesque effect. The parks are maintained by a tax of 9 per cent., imposed on the gross earnings of the street railway companies of the city. This amounted in 1896 to \$243,202.22; a larger amount is expected for the year 1897, owing to increased mileage of the railways and the natural increase of travel.

STREET RAILWAYS.

Baltimore has, without doubt, one of the most complete systems of rapid transit in the United States. Most of the various lines are operated by overhead electric trolley, although two still use the cable system. These latter will doubtless in the near future adopt the electric power, owing to its lesser cost and greater satisfaction in operation. There are in operation in the city at the present time three railway companies, whose various lines traverse the entire city and extend to numerous points in the neighboring suburbs. The companies are the Baltimore Consolidated Railway Company (the Traction and City and Suburban united), the Baltimore City Pas-

senger Railway Company, and the Central Passenger Railway Company. These companies have a total of 285 miles of single track, about 1,000 cars, and employ nearly 2,000 motormen, conductors, substitutes, etc. The men work twelve hours per day as fixed by law, and receive \$1.75 for a day's work. The gross earnings in 1896 were \$2,494,979.71. Their plant is assessed at \$3,956,988. (Since the above article was prepared, the City Passenger and the Central Line Railways have consolidated under the management of the City Passenger Railway Company.)

HARBOR.

The water approaches to Baltimore are among the best in the country, and the largest sized vessels in the world can now arrive and depart with ease from the port without the slightest danger of grounding.

From Fort McHenry to Sandy Point there are nineteen miles of dredged channel, which comprise the Brewerton Cut-off and Craighill channels. They form a water-way 600 feet wide and 27 feet deep. This great work, commenced in 1852, is now, in 1897 under process of deepening to a uniform depth of 30 feet, which will add still more to the commercial advantages of the port. The depth of the lower harbor between Locust Point and Fell's Point and off Canton Piers is 27 feet, which is also the depth to the Baltimore and Ohio and Northern Central Railroad Elevators and coal piers. The Spring Garden channel is 12 feet deep above Bayard street and 17 feet, below the said street. As the best proof of the great harbor facilities of Baltimore, may be cited the ease and dispatch which the immense grain trade of 1897 has been handled at this port.

The projected ship canal across the peninsula of the Eastern Shore to Delaware Bay, which will undoubtedly be built some day, will add immensely to the trade and commerce of the city and materially shorten the voyage to Europe and the Eastern coastwise ports of this country.

CHURCHES.

Baltimore is exceptionally well provided with places of worship, there being no less than 428 church buildings in the city. These are divided among the several denominations, as follows: Baptist, 43, of which 16 are colored; Congregational, 4; Dunkard, 1; Disciples of Christ, 3, of which 1 is colored; Evangelical Association, 5; Evangelical Lutheran, 45; Friends, 2; Orthodox Friends, 2; Independent Churches,

3; Synagogues, 24; Methodist Episcopal Churches, 70, of which 11 are colored; Independent Methodist Churches, 11; Methodist Episcopal Church, South, 10; Methodist Protestant Church, 23, of which 3 are colored; African Methodist Episcopal Church, 20; Ark of the Covenant, 1; Presbyterian, 35, of which 3 are colored; Protestant Episcopal, 40, of which 2 are colored; Reformed German Church, 13; Reformed Episcopal Church, 4; Roman Catholic Church, 51, of which 3 are colored; Seventh Day Adventists, 1; Spiritualist, 3; Swedenborgian, 2; Unitarian, 1; United Brethren in Christ, 9; Universalist, 2.

These churches have, it is estimated, seating capacity for over 150,000 persons, and numbers of them are of most imposing design and graceful architecture, comparing favorably with similar structures in other cities. Notable among these, is the First Presbyterian Church, corner of Park avenue and Madison street. This is a magnificent building and with its lofty and graceful spire, is an object which never fails to attract the attention of strangers. Mount Vernon Place M. E. Church also comes in for a large share of admiration. Aside from its splendid proportions, the surroundings of its location are such as not to fail of notice. The Washington Monument, Peabody Institute, the beautiful public squares with their rare statuary and beautiful fountains and numerous magnificent private dwellings, all combine to form a view which can rarely be equalled, certainly not excelled, elsewhere. Strangers all unite in bearing this testimony.

The Catholic Cathedral, with the Cardinal's residence adjoining, is a splendid specimen of massive church architecture, and is much admired. Jenkins Memorial Catholic Church, corner of Mount Royal avenue and Lanvale street, is of very ornate architecture and presents a most picturesque appearance. Eutaw Place Baptist Church, Christ P. E. Church, corner of Chase and St. Paul streets, the First Methodist Episcopal Church, the First Reformed, corner of Preston street and Maryland avenue, the splendid Synagogues in the northwestern section of the city, the Brown Memorial, corner of Park avenue and Bolton street, and the First English Lutheran, corner of Lanvale street and Fremont avenue, are all attractive edifices and are ornaments to the city at large, as well as to the neighborhood in which they are located. They are not mentioned in any invidious sense but simply as fine specimens of church architecture and worthy of special note.

If Baltimore continues its present rapid rate of church erection, it bids fair soon to wrest from Brooklyn, New York, the title which it has for so long a time held, of the "City of Churches."

Connected with these churches of the several denominations are numerous charitable institutions, comprising orphan asylums, hospitals, homes, etc., which do an immense amount of good. There are at present in Baltimore, 97 of such institutions scattered throughout the city, with an eye to accomplishing the greatest amount of good.

GRAIN TRADE.

Baltimore with her exceptional railway, elevator and harbor facilities is fast forging ahead towards first place as a grain export market, each year's figures showing a gratifying increase. The following table will show a comparison between the years 1895 and 1896:

Exports.	1896.	1895.
Flour barrels	3,049,191	2,485,360
Wheat, bushels	6,588,559	4,033,922
Corn, bushels.....	25,602,693	9,515,021
Oats, bushels	6,621,660	134,318
Rye, bushels.....	1,071,252	.....

During the present year, 1897, the short crops abroad have caused an immense demand for American grain and flour and as a result, Baltimore by her unusual facilities for shipment, has come in for a large share of the trade, and 1897 promises to be the largest in the history of the grain trade.

The following table, compiled from information furnished at the Custom House shows the exports of corn, wheat and flour, for the first nine months of 1897, and their value.

Month.	Bushels Corn.	Value.	Bushels Wheat.	Value.	Bbls. Flour.	Value.
January...	2,753,613	\$ 793,367	60,000	\$ 56,640	197,051	\$899,467
February	5,360,655	1,510,271	87,894	78,159	210,446	934,139
March....	6,322,176	1,815,269	284,669	243,951	174,938	638,310
April	4,640,232	1,359,322	97,210	75,415	101,310	394,458
May.....	3,271,136	988,059	367,479	299,851	108,306	439,734
June	3,019,860	903,358	321,728	248,930	138,793	550,652
July	2,501,016	793,005	1,124,800	862,420	206,414	812,404
August...	3,206,836	1,103,066	5,185,236	4,926,210	162,684	678,092
September	3,793,581	1,318,982	3,724,359	3,682,774	180,953	791,968
Total...	34,969,105	\$10,584,729	11,253,375	\$10,474,850	\$1,480,895	\$6,139,224

These figures show that the shipments of corn for the first nine months of 1897, exceed those of the entire year of 1896 by 9,366,412 bushels, and those of 1895 by 25,454,084 bushels. The shipments of wheat for these nine months, exceed those of the entire year of 1896, by 4,664,816 bushels, and are nearly three times the amount of the shipments in 1895. This is a very gratifying exhibit, rendered the more so, by the activity still continuing. The increased price of wheat during the boom in the trade, besides being very satisfactory to the farmer, will add handsomely to the value of the annual exports from the port for the year 1897.

BUSINESS OF THE PORT.

Among some of the principal exports from Baltimore in 1896, were canned goods to the amount of \$1,458,196; 157,913 bales of cotton; 51,818 tons of coal (this not including the coastwise trade); 83,613 barrels of rosin; 45,276,688 gallons of refined petroleum; 87,973,467 pounds of lard; 45,253,000 feet of lumber; 53,438 tons of linseed-oil cake; 81,392,574 pounds of copper ingot, etc.; 10,000,567 pounds of glucose; 10,410,180 pounds fresh beef; 47,581,864 pounds of cured meats; 9,185,695 pounds tallow; 2,320,341 pounds hams; 26,386,572 pounds of oleo. oil. These figures do not give all the exports from the port, but they give some of the leading articles, and serve to show in a measure the greatness of Baltimore's trade.

Among the principal imports were 365,903 tons of iron ore, an increase of 156,110 tons over the preceding year, and now that the works at Sparrow's Point are in operation again, these figures will be largely increased; 17,626,109 pounds of tin plate were imported, as against 76,415,858 pounds in 1895; 7,666,375 pounds of rice; 17,916,180 pounds of coffee; 119,999,442 pounds of cement; 36,993,831 pounds of sugar;

10,385 tons of sulphur; 3,401,771 pounds of licorice; soda-ash, 33,742,576 pounds. The different class of vessels now employed in Baltimore's foreign commerce may make a difference in the appearance of the port as compared with the days when the wharves were crowded with fleets of sailing vessels; but one of the colossal steamers now plying here is capable of carrying five or six times the amount of cargo than could her sailing predecessor, and the expedition with which the voyages are now made in these days is another important factor. The following figures show the receipts at the Baltimore Custom House since 1890:

1890.....	\$3,105,800
1891 ..	3,267,034
1892	4,003,993
1893	4,016,005
1894.....	3,188,223
1895.....	2,868,169
1896.....	2,262,007

In connection with the above, showing partially some of the leading branches of business in the city, it may not be inappropriate to mention, that a police census of the city, taken in April, 1897, shows that there were 8,750 business houses of all kinds in the city and annex, distributed throughout the city as follows: Eastern District, 393; Northeastern, 1,626; Central, 3,139; Western, 506; Northwestern, 280; Southern, 2,105; Southwestern, 217; Annex, 484. Of the 104,090 dwelling houses of all kinds in the city and annex, 97,129 are supplied with city water and 6,961 are not, 4,194 of the latter being in the annex. The police census also shows that there were 990 *bona fide* factories in the city and annex, scattered throughout the city as follows: Eastern District, 113; Northeastern, 98; Central, 216; Western, 108; Northwestern, 66; Southern, 219; Southwestern, 61; Annex 109.

These factories employ, it is estimated, fully 100,000 hands, including a number of females and children. The capital invested is about \$120,000,000; the annual output \$175,000,000, and the aggregate wages per annum \$42,000,000.

BANKS.

Baltimore has a number of excellent banking institutions, which afford every facility for the transaction of business and enjoy the confidence of the public in a large degree. By the conservative policy of their officials, and the security of their investments, they have been able to steer clear through several periods of panic and distress, while similar institutions

in other cities, have either been pushed entirely to the wall or were financially embarrassed to a greater or less degree.

The banks of the city open every day at 10 A. M. and close at 3 P. M. excepting Saturday, when the closing hour is 12 M., it being a legal half-holiday. Banks are closed entirely on the following holidays: Christmas, New Year's, Twenty-second of February, Fourth of July, Good Friday, Labor Day, Decoration Day, Election Day and Thanksgiving Day.

There are thirty banks in the city, of which twenty-one are National banks. The aggregate capital of them all is \$13,500,000. The "Clearances" at these institutions since 1887, have been as follows:

1887.....	\$659,346,471	1892.....	\$769,355,899
1888.....	620,587,729	1893.....	705,733,232
1889.....	650,583,571	1894.....	673,443,512
1890.....	753,095,193	1895.....	695,707,281
1891.....	735,714,652	1896.....	720,089,733

Owing to the large increase of business in its various branches, the clearances in 1897 are expected to show a very gratifying increase.

In addition to the regular banks, above mentioned, there are in the city thirty-three well managed and prosperous savings' banks, among which are some of the largest in the country, with a very large capital and a host of depositors in all walks of life.

There are also 246 building and loan associations, all of which are well patronized.

Many of the banks of the city of late years have erected splendid and secure structures, which aside from being a sign of their solidity, are prominent landmarks and ornaments to the city.

TAXES.

The assessed value of the real property in the city and annex is \$233,875,443, and of personal securities \$94,429,498, making a total assessment of \$328,429,498. The estimated requirements of the city government for 1897 were \$8,712,706.35, but the city has an income from licenses of all kinds, market rentals, water board, Western Maryland interest and various other sources amounting to \$3,015,429.30, which leaves the amount actually to be levied for, of \$5,697,277.05. To raise this amount, a tax of \$2.00 on the \$100 worth of property is imposed.

This tax is divided as follows: Direct tax, 52 cents; public schools, $36\frac{3}{4}$ cents; interest on stock debt, $32\frac{1}{2}$ cents; police, 30 cents; certain expenses, $7\frac{1}{2}$ cents; general sinking fund, $8\frac{1}{4}$ cents; city poor, 13 cents; opening streets, 10 cents; water loan of 1916, 2 cents; water loan of 1922, $\frac{1}{2}$ cent; water loan of 1926, 1 cent; internal improvement fund loan, 1928, 3 cents; public improvement 1940 loan, 2 cents; four million loan, 1945, $\frac{1}{2}$ cent; funding loan of 1936, 1 cent. Total \$2.00. In addition to the above city tax, there is levied a State tax of $17\frac{3}{4}$ cents on the \$100, making a total for city and State of \$2.17 $\frac{3}{4}$.

The city for a number of years past, has been exempting from taxation all plant and machinery of manufacturing establishments. In order, however, to avail of the benefits of this provision, application must be made annually to the Appeal Tax Court, and this application must be made before the 15th of March annually, otherwise the property will be assessed and taxed. These exemptions in 1896 were as follows: individuals, \$1,207,630; incorporated companies, \$2,140,425; total, \$3,348,055. This of course, is quite a loss to the city in the shape of taxes, but it is thought the impetus given to manufacturing occasioned thereby, much more than reimburses, in the general good resulting to the people at large.

POLICE FORCE.

The police force of Baltimore has long been noted for the personnel of the members and their general efficiency.

It is governed by a board, consisting of three commissioners, who serve for six years each, one being elected at the session of the Legislature, which meets biennially. The force comprises:

Secretary to the Commissioners.....	1
Police physicians	3
Marshal.....	1
Clerk to Marshal.....	1
Deputy Marshal.....	1
Captains.....	8
Lieutenants.....	16
Detectives	15
Round Sergeants.....	14
Squad Sergeants.....	74
Policemen.....	620
Turnkeys	14
Station House Clerks.....	7
Probation Officers.....	35
Matrons.....	14
Total.....	824

The salaries of the force amount to \$785,064.98 annually, and other expenses amount to \$21,525.73, making the total annual cost \$805,590.71.

The pensions paid to retired officers amount to \$1,200 annually. The maintenance of the police boat costs \$5,838.60, and the patrol wagons \$9,087.78 annually.

The police boat has rendered admirable service in deterring harbor thieving, aiding in extinguishing fires, and in saving the lives of drowning persons. A larger and better equipped boat is projected, when the present boat will be used as a reserve.

The present number of the police is now thought to be inadequate, when the large territory to be patrolled is considered, and the next Legislature will be asked to make an appropriate increase.

MANUFACTURES.

Due prominence has been given to Baltimore's importance in regard to its foreign export and import trade, and its many commercial advantages. These have been fully set forth and abundant statistics given to show the greatness of the city's trade in this direction.

Another subject, that of manufactures, deserves or rather demands that careful attention be given it. The list of the factories in the city and State, published in another place in this report, is a goodly showing of the energy, industry and thrift of the people, but with the many advantages possessed by Maryland and Baltimore, both natural and artificial, there is no reason why the number of factories may not soon be indefinitely multiplied, as such enterprises are the very heart or mainspring of a city's prosperity. Although, as has been stated, Baltimore has many industries in her midst, there is room and welcome for many more.

MANUFACTURING SITES.

In the southern section of the city, bordering on the deep waters of the Patapsco, and traversed by the rails of the Baltimore and Ohio Railroad Company, there is a wide belt of comparatively unoccupied territory stretching from Gwynn's falls, on the west, to Fort McHenry, on the east, which would make admirable sites for almost any kind of manufactories. A number of industries have already been established in this locality by far-seeing individuals and corporations, and the prospects are that in the near future this section will resound

with the hum of industry. Streets have been cut through and intersect this "belt," and, with very little preparatory labor, the ground can be made ready for the builder, and sites, it is understood, can be purchased at reasonable figures. The channel of the river runs close to the shore and is at present dredged to a depth of 17 feet, but is capable of much greater deepening should the necessities of trade demand it. Thus, with deep water on one side and with splendid railroad facilities to the very door on the other, this "belt" would seem to be as near perfection in the shape of sites for manufactories as could be well obtained.

This particular locality, however, is not all that Baltimore and vicinity can offer to the manufacturer, seeking a first-class locality for his enterprise. The east bank of the Patapsco, from the Lazaretto to the great steel works at Sparrow's Point, offers thousands of acres, with both water and rail facilities, (the B. and O. and Pennsylvania Railroads,) to say nothing of several rapid transit lines to the city. The Sparrow's Point works and McShane's large foundry at Dundalk are shining examples of the advantages of this section. Across the river, on the Anne Arundel county shore, there is a similar state of affairs, and at Curtis Bay, with its deep water, pier and railroad facilities, a prosperous town has sprung up within the last few years, with a large sugar refinery, extensive car works and several foundries and other industries.

Besides locations on the water front, Baltimore has in its immediate neighborhood numerous eligible sites for manufacturing purposes, where railroad facilities can be secured to the very door. Baltimore is the farthest inland great port, on the Atlantic seaboard, and yet, owing to the deep water of the broad Chesapeake, is practically on the coast. This, in itself, is no mean advantage, for water transportation is notoriously the cheapest, and as a distributing point, with its two "trunk lines," Baltimore is equal to any city in the country, the differential rates recently granted by the railroads putting her on an equal, if not better, footing than New York in this respect. Baltimore's "inland" position in case of a foreign war would be almost absolutely protected and safe from bombardment. The ships of the enemy would be kept back by the defenses at the capes and the nearby forts, now in course of erection, and as no one dreams that a foreign army could successfully invade, Baltimore's industries would not likely be disturbed, in the unfortunate event of a

war happening. This last would, in itself, not to speak of other advantages, be an excellent reason for the government to locate the proposed armor plant here. All manufacturing plants in the city of Baltimore are by special ordinance exempt from city taxation.

Workmen can readily obtain cosy, comfortable houses, with bath and other conveniences, within easy walking distance of the "belt" in South Baltimore, alluded to above, and electric cars furnish cheap and rapid transit to all portions of the city and suburbs.

Neat and comfortable two-story houses, of six rooms each, with all modern conveniences, can be obtained on nice streets as low as \$12 per month, (which includes water rent.) Three-story houses, with the same advantages, can be had at from \$15 to \$18 and \$20 per month. As regards manufacturing, experience shows that comfortable dwellings are built simultaneously with the factory, or very shortly follow. The hours of labor differ in the various factories in the city, according to the occupation, but the average day's work is ten hours.

Many things combine to make Baltimore possibly one of the cheapest markets for building materials in the country. Right at her doors is the best obtainable brick clay, from which millions are made annually. Baltimore brick have obtained a wide reputation, and the large shipments made to other cities is sufficient proof of their quality and cheapness. The limestone quarries of Baltimore county and oyster shells from the numerous packing-houses furnish the best of lime, at the lowest rates, while the best sand can be obtained from the shores of the river and inexhaustible sand banks in the neighborhood. Marble, granite, bluestone, limestone, etc., are extensively quarried in the immediate vicinity; quantities, in fact, inside the city limits. Lumber comes by water, at low rates, from Virginia, North Carolina, Georgia and Florida.

Roofing material, such as tin, tiles, shingles and slate, is sold at the lowest prices. Tin plate and tiles are both manufactured in the city and brought from abroad in ships, direct from the place of manufacture, ensuring the lowest rates. Slate is found in abundance in close proximity to Baltimore, that coming from Delta and Peach Bottom quarries, in Harford county, being of a particularly fine quality. The freight rates to Baltimore, the distance being so small, are merely nominal. Builders, iron work is manufactured in Baltimore, of the best workmanship and at low prices.

The advantages of Baltimore as a receiving and distributing point alluded to, are of immense benefit in the reception of raw material for use in the various industries, and for shipment after manufacture. In textile works, such as woolen and cotton factories, the raw material is brought here at exceedingly low rates. Raw wool comes via railroads from Western Maryland, Ohio and other western States, while the foreign wool comes by steamer direct. Cotton comes principally from Savannah and Norfolk by steamer, and competition between transportation lines has brought freight down to a minimum. The nearby tanneries in Maryland, Pennsylvania and the Virginias furnish abundant material for the various leather industries. For the iron industry, in its various branches, our Maryland mines and those of Virginia, furnish native raw material, and those of Spain and Cuba are brought here in steamers direct. Extraordinary advantages are offered for the manufacture of tobacco, by the nearness of the Maryland and Virginia plantations, and the consequent cheap transportation rates. In fact, the facilities offered by Baltimore in this way for the different industries are very great, and cannot be underrated.

Baltimore finds a market for her products all over the United States, but principally in the west and south, those States, owing to their location, being her natural customers. Large quantities are also shipped abroad.

In connection with raw material it must not be forgotten that the bituminous coal from the mines in the western part of Maryland is considered the best to be had for steaming purposes. It is brought to Baltimore by rail, for shipment to northern and eastern ports, as well as to the Pacific coast, and consequently is sold here at a much lower figure (averaging from \$1.00 per ton less) than at any of the seaboard cities.

CHAPTER IV.

GROUND RENT SYSTEM IN BALTIMORE.

Baltimore ground rent system, though it has been in operation for over one hundred years and has been very generally discussed, seems to be only partly understood by a majority of people. Many persons unknowingly condemn it, while there are others who strenuously uphold it. The first-named class say that it has had the effect of retarding the progress of the city more than any other one thing, while the latter insist that it has many good features in connection with it, which makes it a good system to which to adhere. They also add, with considerable force it must be said, that good or bad, we cannot change it, so long as the United States Constitution remains as it is, for that instrument expressly forbids any State to "pass any law impairing the obligation of a contract;" and as the leases upon which the ground rent system is built are legal contracts, it would seem as one of our permanent institutions, or at least until the Federal Constitution is so amended as to permit such a change as may appear desirable.

ITS ECONOMIC EFFECTS.

In view of these circumstances, it has been thought proper to place before the public a brief history of the institution of this peculiar form of lease, together with an explanation of its economic effects. The legal features have been ably presented by Mr. Lewis Mayer, of the Baltimore bar, and his work has been drawn upon to some extent. He does not treat it, however, from an economic standpoint.

HISTORY.

The ground rent system appears to be an evolution of the old feudal system in Europe, with numerous modifications. We originally derived our tenure of land in Maryland from the charter granted by Charles I to Cecil, the second baron of Baltimore, and the territory embraced within the limits of this State, became the property of Lord Baltimore, who was absolute lord and proprietary of the province, with the

right to enact laws with the advice, assent and approbation of the freemen of the province, or of their deputies or delegates, to be called together for the framing of laws; to establish courts; to preserve the peace of the province; to remit and pardon crimes and offences; to exact military duty from the inhabitants of the province, and to wage war against its enemies; to enjoy the taxes and subsidies payable in the ports, harbors and creeks within the province, for wares bought or sold, laden or unladen. There was also a provision that the English government disclaimed its right of taxing the colony, which later was afterward violated, despite the provisions of the charter.

According to the eighteenth section of the charter, the Baron of Baltimore was granted the power to assign, alien, grant, demise, enfeoff the lands of the province in fee simple or fee tail, or for term of life or lives, upon such terms as should seem fit and agreeable to said baron.

Under the section, all grants or patents passed under seal by Lord Baltimore, contained a provision that quit-rents should be perpetually paid to him annually or semi-annually, by the tenant of the land, in acknowledgment of the tenancy. The proprietary was also entitled to caution money and composition money, the consideration paid at the time of taking out the warrant, and at the return of the certificate on which the patent was issued from the Land Office. There were also feudal fees known to the law of England as alienation fines.

It has been estimated that the annual value of the quit-rents to the proprietary at the time of the Revolution was £30,000, though as this was his personal estate no public record was required to be made of it, and the above named sum is not much more than a guess, which may or may not be true.

The Bill of Rights, adopted in 1776, asserted that the inhabitants of Maryland are entitled to all property derived by them under the charter granted by Charles I to the Baron of Baltimore, and the General Assembly in 1780 declared that the citizens of this State, "from the Declaration of Independence and forever thereafter, be and they are hereby exonerated and discharged from the payment of quit-rents to the Lord Proprietary or any other subject of a foreign prince, and that the same be forever abolished." In the same year an Act was passed for the confiscation and seizure of British property, and all the late proprietary's lands and manors were taken by the State. A later General Assembly further declared that the payment of quit-rents, even to the

State of Maryland, "should never be exacted, and that the citizens of this State should hold their lands on equal terms with the citizens of the other States."

The legislation was a great gain for the large landed proprietors, for from that time forward they held their lands in fee-tail or fee-simple, and entirely free from these feudal exactions. Those who held, under original grants, it is true, had to apply the caution and composition money, but these payments represented a very much less sum than the value of their lands, which value had increased rapidly.

The step from this to ninety-nine year leases was a short one, and they were adopted chiefly in Baltimore. These long leases were early known in England, though there were no covenants for renewal similar to the Baltimore system. The system in use in Ireland had a covenant for renewal, but differed in many other particulars. The Irish leases were determinable upon lives, (and ninety-nine years was regarded as about the time of three lives,) with a provision that upon the fall of each life a renewal could be effected upon the payment by the tenant of the amount of one year's rent for each renewal within twelve months thereafter the fall of each life. It is extremely likely that these leases were known to some of our earlier attorneys, and with the modifications necessary to conform to a commercial community were adopted here. The purpose was, of course, to create permanent result for the benefit of the landowners and at the same time to secure the tenant such use and enjoyment for a long term of years as would justify him in making permanent improvements.

The earliest renewable lease for ninety-nine years was made by Thomas Harrison, about 1750, and contained a covenant permitting the lessee to obtain a renewal upon the payment of a year's rent, which renewal was upon the same terms as the lease just expired, and further stipulated that the lease might be renewed from time to time, forever. The present form, in its essential provisions, is as follows: The owner of ground in fee simple, in consideration of the payment of the rent and the performance of the covenants thereafter in the deed of lease, made on the part of lessee, his executors, administrators and assigns, to be paid and performed, "demises, grants, leases and to farm lets," to the lessee, his executors, administrators and assigns, a lot of ground, to have and to hold the same, &c., to the lessee, his administrators and assigns, from the next day before the day of the date of the

lease, "for and during and until the full end and term of ninety-nine years thence next ensuing, fully to be completed and ended: Yielding and paying therefor to the lessor, his heirs and assigns, the yearly rent or sum of ——— dollars on" (specified days, either annually, semi-annually or quarterly from the date of the lease,) "in each and every year during the continuance of the demise, and that free and clear of all deductions for taxes, assessments and public dues of every kind and nature whatever, that they are now or which may be at any time or times hereafter levied, charged or assessed on the demised premises or on the yearly rent issuing therefrom." If the rent be in arrear for sixty days, the lessor may re-enter and hold premises as in their former estate, and in such case the lease shall thenceforth be void and of no effect.

These may be renewed at any time during the continuance of the demise, on the request and at the cost of the lessee or his heirs, and on his or their paying a certain sum.

All ground rents, made since 1884, are redeemable. Those created between 1884 and 1888, are redeemable after fifteen years and since 1888 after ten years. These rents may be redeemed by the lessee on a payment of the capitalized value of the rent at six per cent. Thus, if the rent should be \$60 per annum, the capitalized value would be \$1,000.

Though there is no record as to the amount of land so held in Baltimore, under these various kind of leases, the officers of the Tax Department estimate that seventy-five per cent. of the property held, is subject to a ground rent, which will gradually be lessened as the time for redeeming those rents expires.

ECONOMIC EFFECTS.¹

One of the most important effects of the ground rent system is that it enables persons who desire to buy houses to do so at a much less cost than for similarly constructed houses in other cities. There are several reasons for this. In the first place, if a land-owner's land be vacant, he is, naturally, very desirous of having it improved by the erection of a house, from which he cannot only get his ground rent, but upon the tenant of which he can shift the tax upon the land. This very natural propensity extends to all land-owners, and there is thus a constant supply of houses always in the market. The competition between land-owners has developed a system of "advance," or "bonus," building, about the value of which to the community there is a vast difference of opinion.

"Advance," or "bonus" building is so called by reason of the fact that the owner of the land advances certain sums of money upon the completion of each story of the house to be erected.

One of the results of this system is to cause the landowner to place a greater valuation upon his lot than he would otherwise. For example, if a lot be worth \$700 which would justify a ground rent of \$42, and the owner thereof advances \$300 to the builder as a bonus, he (the owner) immediately advances the capitalized value to \$1,000, and places the ground rent at \$60.

In many instances, alas, the builder finds himself unable to carry out his part of the contract, and the house, or that portion of it which is completed, falls into the hands of the landowner, who will in many cases throw it upon the market for what it will bring. This, while a good thing for the prospective house-buyer, often inflicts a hardship upon the mechanics and laborers employed upon the house, for the reason that the builder has been unable, or unwilling, to pay them their wages. The defective Mechanics Lien Law precludes them from placing an effective alien upon the house, and they are thus prevented from obtaining legal redress in the matter.

For the same reasons the persons supplying the material which has entered into the construction of a house built under the circumstances, very frequently lose large sums of money.

Another system sometimes employed is when the landowner agrees with a builder to erect a row of buildings, and with dealers in building materials to furnish the necessary supplies, the builder and material-men agreeing to accept one or more of the houses in payment of the services or material supplied. This seems to be a better system than the one already described, inasmuch as each person at least gets that which he has agreed to accept. It, of course, has the same effect upon the price of houses in the open market, for each person concerned is generally anxious to exchange his house or houses for ready cash.

Another important feature of this system is the fact that many of the lands are leased at a price much below the present value. This is especially true of the older leases, for in some cases the land has vastly increased in value and the ground rent paid bears no relation to the value of the land. In some cases the ground rent exacted is a merely nominal sum, such as one cent. These lands are for practical purposes in fee

simple, though they are not so regarded in law. Thus we find persons who are nominally house owners are, in effect, landlords.

On the other hand, there are certain sections of the city where the ground rents are relatively high, because they were set at a time when the neighborhood was a very desirable one, but which has now fallen greatly in desirability, due to the colonization of offensive neighbors. In fact, it is no doubt true that the reason a certain class have flocked to these neighborhoods is by reason of the ground rent system. The house owner being unable to find a suitable tenant to occupy the entire house has been compelled, in order to realize his expenses, to practically turn into tenement houses what were formerly elegant dwellings.

A very common complaint of the ground rent system is heard by house owners who occupy their own dwellings. This is, that it is unfair to them to be compelled to pay taxes upon the land, which they do not own, as well as upon the house, which they do. A little reflection, however, will disabuse their minds of this seeming injustice. The occupant of a lot or house must always pay the taxes thereon whether he be merely a tenant or the owner. It is a general principle upon which practically all political economists agree, that the person who actually uses an article must pay the taxes and all other charges.

Though this ground rent system is far from being an ideal one, there can be no doubt that it is a distinctively better system than that prevailing in most American cities. The poor and middle classes must, in the very nature of things, be renters, and it is noticeable that rents are very much less than in cities of similar size. The further fact that tenement houses are comparatively few in Baltimore can unquestionably be traced to the operations of this system. This has many times been commented upon by strangers locating in Baltimore, though not being acquainted with the ground rent system, they have not been able to account for it.

The evils in the system of "advance building," about which so much complaint has been heard, could doubtless be cured by proper amendatory legislation in connection with the mechanics lien law, and the mechanics and laborers of the community would receive the full benefits it is in the power of the system to confer.

In an address recently delivered by a real estate broker of this city, before the Taxpayers' Association, we find the ground rent system thus severely criticised:

“Another reason for the deficiency in our taxable basis can be found in the very interesting fact that every taxpayer in the State has been paying tribute to the holders of irredeemable ground rents.

“Irredeemable ground rents have been growing in value at the expense of the house owner, and the leasehold interest, as well as the city and State. In other words, the house or leasehold interests, as a general rule, has declined in value, and under our unjust system of taxation there has been no recognition of this important fact. If even handed justice is meted out to the owners of every house which is subject to an irredeemable ground rent, and the house or leasehold interest is assessed under the new law, at its market value, down goes the taxable basis, and up goes the taxes upon all other property, and in this way every property holder in Maryland is made to pay tribute to the holders of irredeemable ground rents by an increase of their taxes. A practical illustration of this injustice is now before me—an irredeemable ground rent of \$132 was sold in 1877, for six per cent., or \$2,200, and at the same time the house on which the ground rent of \$132 was created, was sold for \$5,000. To-day, about twenty years after the house and ground rent was purchased, the owner of the ground rent, after receiving six per cent. on his original investment for twenty years, was able to sell his irredeemable ground rent of \$132 for \$3,500, or \$1,300 more than he paid for it, while the owner of the house would be glad to get \$1,500 for the house which cost him \$5,000. The owner of the house, therefore, loses \$3,500, while the owner of the ground rent is able to pocket \$1,300 more than he paid. Now, if justice is done the owner of this house, and all similarly situated houses are assessed at their real market value under the law, there must inevitably be a great decline in the value of all such houses, and a great decrease in the taxable basis, and a corresponding increase in the taxes.

“If this be true, and there can not be any doubt, then every property holder and taxpayer in the State has been punished and made to pay tribute to the holders of irredeemable ground rents. Nor is this all, the injustice does not stop at this point. Under our system of taxation, no matter how much the ground rent appreciates in value, there is no recognition of this important fact. The owner of the house alluded to, and every similarly situated house in Baltimore, has practically been compelled to pay, under this iniquitous tax system, three different kinds of taxes. First, he pays a tax on the

only thing he really owns, that is, the value of the house. Second, he pays a tax upon what he does not own, and that is the value of the ground; and third, he pays in addition, what is worse than all, a most barbarous tax on what he has actually lost, and the owner of the ground rent has actually gained, while the owner of the ground pays no tax whatever, either upon his ground rent, or upon what he has actually gained and made off the poor fellow who owns the house. Under this system of taxation, the owners of irredeemable ground rents have been allowed to almost eat up, body and soul, the poor house owner and the leasehold interest, and there is often nothing left but the corpse or last remains of the leasehold interest. The result of all this unjust and crooked business is a great decrease in the value of all property, especially houses, a decrease in the taxable basis, and an increase of the city debt and city taxes, and as a final result, we have the owners of about \$60,000,000 worth of ground rents, the most valuable property in Baltimore, who pay no direct tax whatever, either upon the original cost of their ground rents, or upon the amount they have made off of the poor house owner. They are allowed to reap what they have not sown. This creates a privileged class in the community. It is class legislation of the meanest kind, and is a direct violation of the spirit and intention of both the Assessment Law and the Constitution of the State."

There is no subject that is more worthy of the careful consideration of the mechanics and laborers than this one, and the deductions from known facts point to the remedy suggested.

CHAPTER V.

THE BALTIMORE HARBOR AND CHANNEL.

At this time, when so much discussion is taking place in regard to the commercial importance of Baltimore, it will be interesting to examine the facilities offered by that city for foreign commerce. I have, therefore, prepared from the reports of the various engineers in charge of the ship-channel of Baltimore the following instructive information on that subject.

The accompanying letter from Major Craighill, written at the request of the Patapsco River Improvement Board, gives a succinct and comprehensive statement of the work done on the channel prior to June 26, 1874:

GENTLEMEN:—It is my agreeable duty to announce to you, as the representatives of the interests of the city of Baltimore in the matter, the practical completion of the work undertaken for the improvement of the ship-channels connecting your city with the deep waters of the bay.

Before referring to the present condition of the work, it will be, perhaps, interesting to review its past history to some extent. From its earliest settlement Baltimore has steadily progressed in importance as a commercial entrepot until today, when her prospects seem more brilliant than ever before.

HISTORY OF THE IMPROVEMENT.

During the earliest period of this era of progress, owing to the moderate draught of the shipping then in use, there was no difficulty in reaching the city by the natural channels, which afforded a depth of from sixteen to eighteen feet at mean low water. In course of time, as the comparative economy of transport in large vessels was apparent and admitted, it became equally evident to her citizens that if Baltimore was to retain and increase her European trade some measures must be adopted for obtaining a greater depth of water in the ship-channels.

It has not been found practicable to ascertain exactly when this subject was first agitated among the citizens, but we find

in 1852 (nearly a quarter of a century ago) a fact giving evidence of a foresight and energy which her recent action in this matter shows has not deserted her people—a “Board of Commissioners of the Patapsco River Improvement” was in existence, consisting of Messrs. Brune, Leslie, Cooper and Brown. This Board was charged with the expenditure of a special appropriation of \$50,000, made by the city, together with a portion of the duties levied by the State on auction sales, not exceeding \$20,000 per annum, which was, by a special law, transferred to the city for use in the improvement of the ship-channels.

About the same time (1852) an appropriation of \$20,000 was made by Congress for this purpose, and Captain (now Colonel and Brevet Brigadier-General) Henry Brewerton, U. S. Corps of Engineers, was placed in charge of the work, with instructions to prepare and submit a project for the accomplishment of the desired ends.

The area covered by this proposed improvement naturally arranged itself in two divisions: The upper commencing at Fort McHenry and extending one and a half miles below Fort Carroll, was six miles long, and had an average natural depth of from nineteen to twenty-one feet at mean low water; the lower division extending from a point one and a half miles below Fort Carroll to the entrance buoy of the old ship channel, about four miles beyond North Point, was nine miles in length, with an average depth of only sixteen to eighteen feet of water.

A comparison of the earliest and latest hydrographic surveys showed very slight changes in the general depths and conditions of these channels, indicating thereby that the river, and portions of the bay adjacent to the river's mouth, had established an equilibrium between the forces of the flowing waters and the resistance of the banks and bed; and that, while the operation of natural causes would always tend to preserve and restore this condition, yet it would necessarily be very gradual in its operation, owing to the feeble currents produced by the small rise and fall of the tides, the large area of water-way, and the infrequency, if not the entire absence, of sediment-bearing freshets.

Under these conditions it was evident that the excavation of a channel of the required dimensions was in this case the most proper and economical method of effecting the improvement.

THE BREWERTON CHANNEL.

We find accordingly that in the autumn of 1852, Captain Brewerton recommended the formation, by dredging, of a channel 150 feet wide and twenty-two feet deep at mean low water, extending in a direct line from Fort McHenry to a point one and a half miles below Fort Carroll, and thence in another straight line a distance of nine miles to the old ship-channel entrance buoy, about four and a half miles beyond North Point. He further advised, as the natural depth in the upper division was so superior to that in the lower, (being in fact nearly as great as was then thought to be required,) that all operations be concentrated in the lower division, until it was at least equal in efficiency to the upper. It may be well here to state that this recommendation was approved and rigidly adhered to, and that no work was done between Forts Carroll and McHenry until the spring of 1873.

The dimensions given above were only adopted by Captain Brewerton after consultation with the Board of Commissioners, pilots, and many others interested in the work. Much difference of opinion prevailed at that time as to the required widths and depths, but those given above were finally adopted by both the Government and city authorities as being best suited to the combination of means at command and the requirements of navigation.

As the result of a conference between Capt. Brewerton and the Board of Commissioners, a joint plan of action was adopted, and from that time to this, the two parties have worked harmoniously together on this important work, generally, if not always, in accordance with the plans and under the general direction of the officers of the general government who have successively had charge of the operations at different times.

At the time Capt. Brewerton assumed direction of this work, the city was in possession of a dredging machine, said to have cost \$70,000, which was then operating about the wharves. The style and ultimate fate of this costly machine are involved in obscurity, but it seems never to have worked on the river improvement proper.

After an exhaustive examination of the various kinds of dredging machines then in use, Capt. Brewerton recommended the adoption of the Osgood patent, as then constructed by Mr. A. H. Cooley of Philadelphia, as being the best adapted to the execution of this particular work.

In accordance with this recommendation, the commissioners ordered one dredge of this gentleman in December, 1852, and another was contracted for by Capt. Brewerton for the United States in the following April, 1853.

In October, 1853, operations were commenced, under Capt. Brewerton's supervision, on the line of the new channel, by the city and the United States, with a force of one dredge each. Owing to the superior and nearly sufficient depth in the channel above Fort Carroll, it had been determined (as previously stated) to confine operations first to the completion of the lower division of the channel, and accordingly these dredges commenced work at the angle below Fort Carroll. Operations were continued by the two dredges until December 17, 1853. They resumed work in May, 1854, and in July, a second dredge was added to the city force, the three dredges working thence until December 2, 1854.

Operations were resumed with the same force in May, 1855, and continued until January, 1856, when a cessation became necessary for repairs, work being recommenced in May following. During this year Congress appropriated \$100,000 additional, and in the fall two more dredges and a tug boat were contracted for by Captain Brewerton, which joined the force already at work on the channel in May, 1857, making a total of five dredging machines and two tug boats, each dredge having four scows for the conveyance of excavated material to the dumping grounds along the shore.

The dredges were removed to town for repairs, &c., in February, 1858, returning to the work in March, with a fourth dredge added to the force by the General Government. In September of this year (1858) the Government appropriation became exhausted, and the operations on the part of the United States were suspended by Captain Brewerton.

One of the dredging machines and its scows was lent to the Board of Commissioners, who continued the work on the channel during the remainder of the season of 1858, and those of 1859 and 1860. The improvement of the ship channel ceased from this time for six years (until 1866.)

At the time that operations ceased in 1860 the results obtained were a channel 150 feet wide and about 22 feet deep at mean low tide, from a point one and a half miles below Fort Carroll to a point just beyond North Point, about four and a half miles in length, and several incomplete cuts extending a mile or two below; but the whole work was left in unfinished and incomplete condition. It is proper, also, to remark here that

from the cessation of operations in 1860 until the summer of 1871, the amounts of the appropriations were so small that little more could be done than holding the depth already gained.

The original estimate for this channel was - \$390,000 00

Expended to date of suspension--

By United States	- - - -	\$120,000 00	
By city and State	- - - -	184,317 06	
			<hr/>
			\$304,317 06

Balance on original estimate	- - - - -	\$85,682 94
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This division of the improvement was at this time named by the Board of Commissioners the "Brewerton" Channel, and as it has been known from that time by this name it will be so designated hereafter.

THE CRAIGHILL CHANNEL.

No further steps were taken for the completion of this work until 1866, when the General Government having appropriated \$15,200, a careful resurvey was made; under my direction, of the river and bay below Fort Carroll, which developed the fact that the action of the tides and currents coming down from the upper bay and the Susquehanna had materially injured the excavations made below North Point, and that all the lower portion of the original line eastward of Seven Foot Knoll light was subject to obstruction by fields of ice. In consequence, a new location was made, deflecting from the Brewerton Channel three-fourths of a mile below Seven Foot Knoll light, near the terminal point of the work completed previously, and running thence due south toward Sandy Point light. On this line a new channel was projected 200 feet wide and twenty-two feet deep at mean low-water.

The dredges, three in number, with their complement of scows and one tug-boat, having been put in order, commenced operations at upper end of new cut south from the Seven Foot Knoll, and were continued during the successive seasons of 1866, '67, '68 and 69.

In September, 1867, I was succeeded in charge of the work by Brevet Major-General Parke, major of engineers, who carried on the work in this channel until May, 1868, when he was relieved by Brevet Brigadier-General Simpson, colonel of engineers, who, in November, 1869, announced the due south channel as open to commerce, 200 feet wide and twenty-one

feet deep, and that the Brewerton Channel had been re-opened for a limited width to the same depth.

Here I must be permitted to refer to a matter which has been an embarrassment to me, but the explanation should be made, and perhaps no better occasion will occur. My name has been given to the lower or new channel. This was done through the courtesy and kind feeling of my friend, Gen. J. H. Simpson, Corps of Engineers, without consultation with me.

In 1870, an appropriation having been made by Congress of \$42,900, the dredges, tug and scows were thoroughly repaired and set to work in the Brewerton Channel, where they continued until November.

During that month I was again placed in charge. During this winter the government dredges and scows, being old and much worn, requiring frequent and costly repairs, were sold, and the work was thenceforth carried on by contract, with a marked increase in rapidity of execution and an equally marked decrease in cost.

Fifty thousand dollars having been appropriated by Congress in March, 1871, contracts made with Mr. Brainard, of Albany, N. Y., and Mr. Dodge, of Fulton, N. Y., for the removal of about 310,000 cubic yards of material. The former contractor commenced work in July in the Brewerton Channel, and the latter in the same channel in September following. The work was also actively assisted in this season by Captain Cooper, port-warden, with two dredges belonging to the city.

In the spring of 1872 Congress appropriated \$100,000. The great increase in the commercial importance of Baltimore since the late Civil War, and the great development of her foreign trade, especially in her steamship lines, made the pressure so great for more rapid progress than was possible by the use of the Government appropriations alone, that in the spring of this year, (1872) your board was organized by the city, and \$200,000 placed at your disposal for immediate application.

The availability of this additional amount of money rendered easy the execution of the work in a much more energetic and satisfactory manner than had been possible hitherto; the fact being that the very limited amounts previously devoted to it had not much more than sufficed to retain from year to year the advances already made, and to prevent the deterioration which natural and incidental causes necessarily produce.

It also rendered possible the completion of the improvement on a much larger scale than originally contemplated, and on one to render it competent to meet the requirements of today, which differed so greatly from those existing at the inception of the undertaking.

It had been perceived for several years previous that to make the improvement really efficient, it would be necessary to increase considerably both the width and depth of the proposed channels. This had, indeed, been recommended, but no steps taken toward its actual consummation.

During this spring, however, (1872) the whole project was revised, and the channels marked out in three divisions, of dimensions as follows: From Fort McHenry to the angle below Hawkins' Point, 250 feet wide, 24 feet deep at mean low water; thence to angle near Seven-Foot Knoll, (Brewerton channel), same dimensions; thence due South towards Sandy Point, 250 feet wide, through softer portions, and 400 feet through oyster beds and hard lumps, and 24 feet deep throughout.

Early in the summer of 1872, under existing contracts for nearly 300,000 cubic yards on the part of the general government, and for 450,000 on the part of your Board, operations were commenced on the revised project, with a total of thirteen dredges, three of them being of the clam-shell type, and forming altogether probably the largest force of dredges ever employed in this country at one time on the same improvement. The larger portion of this force was placed at work on the northern side of the old Brewerton channel to excavate the additional width to that section of 100 feet, while three dredges were engaged on the lower portion of the Craighill channel.

This addition to the Brewerton Channel 100 feet wide, 24 feet deep and six and three-quarter miles long, was completed during the year 1872, and the buoys marking the northern edge of the cut were moved over to permit the unobstructed use of the new channel, while the dredges should be engaged in deepening the old one.

During the early Spring of 1873, the sum of \$350,000 was made available, the General Government and the city of Baltimore contributing nearly equal portions. Contracts were entered into by your board with Messrs. Morris and Cummings for the removal of 760,000 cubic yards of material (subsequently increased to 960,000 cubic yards), and by the General Government with Messrs. Curtis, Fobes & Co., for the

removal of 750,000 yards; there was also remaining unexecuted the major part of a contract with Mr. G. H. Ferris for the removal of 300,000 yards from the Craighill Channel. Of these amounts 835,000 yards were to be removed from the Brewerton Channel, 750.00 from the Fort McHenry Channel, and 375,000 from the Craighill Channel. The main portion of this work was executed during 1873, the contractors suspending work a short time during the winter for repairs, and finally completing their contracts during April, 1874.

We have thus traced this work through its various stages of progress to what may certainly, in a measure, be termed its completion.

HOW THE WORK WAS DONE.

The marked incidents connected with the last two years of its progress are the decline in the cost of dredging, and the increase in the rapidity of execution. It is not too much to say that with the machines heretofore used in this work, and at their usual average of daily work, it would have required from five to eight years to accomplish the same results.

From the 10th of April, 1873, to the 10th of April, 1874, seven dredges of the clam-shell type excavated and removed an average of 900 yards each, per day for each calendar day, including sunshine and storms, Sundays, holidays and delays and stoppages of all kinds. Their execution during actual working days at times reached over 3,000 yards per day. The greatness of this advance will be perceived when it is considered that a *very good* average under similar circumstances for the dredges heretofore employed would be 250 yards per day. Their *maximum* capacity being from 600 to 700 yards per day.

At the same time the price per cubic yard for this work has been reduced from 37 cents in 1871 to 22 cents in 1873.

One of the chief difficulties of the work has been, in so broad an expanse of water as is presented by the lower Patapsco and the bay, to keep the dredges in place in the excavation of a narrow channel.

LOCATION OF THE CHANNELS.

It may, therefore, be relevant to present a brief outline of the methods used for determining the proper locations for these channels, for securing the accuracy of their alignment during the execution of the work, as well as the proper execution itself.

In the first place, general surveys were made to determine the best location for the channels as to depth, &c. These results being plotted, the lines were laid down on the map, and their positions determined with reference to certain established points on shore. With these data, and from these fixed stations, points in the selected lines for the channel were accurately determined by triangulation, and marked by wooden piles, driven into the bottom of the river or bay. These points being for each channel on the same side, formed continuous rows, the slightest irregularity in which would exhibit itself to the most casual observer. The next step was to determine the depth of water within those limits more specifically and fully than the general survey would permit. For this purpose another survey was made, confined entirely to the limits of the channel as laid down, the state of the tides being noted continuously at regular intervals of time, at the stations along the routes.

Being thus prepared for work, the dredges were brought into the channels and their positions fixed latterly by measurement with cords and wires from the lines of piles before referred to, their movements, forward or backward, being regulated and accurately measured by means of the lines extending astern to the anchor fixed in the bottom. Each dredge had in its vicinity a tide gauge to regulate the depth of cutting, and an inspector, whose duty it was to see the dredge properly located, to determine the depth to which the bucket should descend, to regulate the alignments and progression of the dredge, and to see that the scows were fully loaded, as well as to record their number and contents.

CONCLUDING REMARKS.

The work as now submitted to your inspection has had for its object the accomplishment of the following results: *To permit the approach to Baltimore at mean low water of vessels drawing from 22½ feet to 23 feet, and at ordinary high water of vessels drawing from 24 or 24½ feet.* This is attained by the completion of this channel with a depth of 24 feet at mean low water.

A width of 250 feet has been given where the material on the edges is not of sufficient hardness to injure a vessel touching it.

This is the case throughout from Fort McHenry down through the Brewerton Channel and about two miles in length

of the lower channel. This, however, is regarded as a *minimum* width, as the sides are likely to be occasionally struck by large vessels, especially steamers, whose lengths are greater than the width of the channel, and which may not be kept exactly in the line of the channel. Where the sides are thus struck masses of material are thrown into the channel.

In some parts of the lower section of the channel, where the harder material of the oyster-banks or lumps was found to some extent, the width has been made 400 feet, to diminish the probabilities of vessels touching the sides; in fact, to remove all danger of such striking if due care is exercised by navigators. In some portions of the lower channel there was provided by nature herself a much greater width than 400 feet, and a much greater depth than 24 feet. Of course, in such parts no dredging has been necessary. At the turn from the Brewerton to the lower channel, which is an angle of about ninety degrees, the width of the channel has been made about 1,000 feet, to give ample room for vessels passing that point. In a small portion of the lower channel the material of the bottom is so very soft that while the surface of this fluid mud is only $22\frac{1}{2}$ or 23 feet below the surface of the water at low water, it appears no real obstacle to the passage through it of the keel of a vessel drawing 23 feet at the same stage of the tide. The last survey reveals the existence of a few very small areas where a little deepening is necessary.

It is not to be forgotten, that this channel is an *artificial* road or highway, of the same general character in that respect as a railway, or canal, or ordinary wagon-road. It did not exist by nature. It was *made*, and to be kept in good condition *it requires care in its use and annual repairs*.

Range lights and buoys have been provided to enable careful navigators to find this highway, and to keep in it safely as well by night as by day. The sum which will be required annually to keep this highway in its present condition need not exceed, and will be probably less than \$50,000, but *it should be regularly provided and judiciously and economically applied*. The constant and careful use of the channel by heavy ships, and especially by screw steamers, will improve its depth, rather than injure it. The sum of \$75,000 has just been provided by Congress for this improvement.

The result now reached in the creation of this artificial highway has been obtained only by the patient and persistent and combined labor, through many years, of many persons on the water, and in the office. Let each receive his due

share of credit. Much of this labor has been performed under my supervision, and I desire to say emphatically, that, if this work is of any value to the great city of Baltimore, she owes more for it to Mr. N. H. Hutton than to any other person. I feel under great personal obligations to him, while assisting me in the performance of my duty, for the exhibition of much energy, patience, and skill by him, and it is but his due for me to say so in this connection. He has had the immediate charge of the operations.

In conclusion I beg to express my sincere thanks to the members of your board for the confidence manifested, and the support at all times given to me during my connection with the work.

Very respectfully, your obedient servant,

WM. P. CRAIGHILL.

The following extract from the annual report of the Chief of Engineers to the Secretary of War, gives an account of the work accomplished on the channel to September 19, 1893:

IMPROVEMENT OF PATAPSCO RIVER AND BALTIMORE HARBOR, MARYLAND.

These works were in the charge of Col. William P. Craighill, Corps of Engineers.

1. Patapsco river and channel to Baltimore Md. The depth of this channel has by successive steps been increased from seventeen feet at mean low water to twenty-seven feet, with an average rise of tide of about eighteen inches.

The project of improvement first adopted and commenced in October, 1853, had for its object to give a channel twenty-two feet deep at mean low water, with a width of 150 feet.

Little was done before the late war, but afterwards these dimensions were increased, a depth of twenty-four feet at mean low water being determined upon, with a width of channel ranging from 250 to 400 feet.

This channel was completed in 1874, important changes of position having been given to a portion of it, while the distance was materially lessened and the expense of maintenance decreased.

The object of the improvement was to permit the approach into Baltimore, at mean low water, of vessels drawing from $22\frac{1}{2}$ to 23 feet, and at ordinary high water, of vessels drawing 24 and $24\frac{1}{2}$ feet. Later the project had in view a depth of 27

feet at mean low water, with a width of 600 feet, to allow the entrance and departure of the largest vessels.

Up to June 30, 1892, the United States had expended \$2,932,517.01. The city of Baltimore and State of Maryland, chiefly the former, have also contributed to the same object more than \$500,000. The expenditure, up to June 30, 1893, by the United States, was \$3,186,215.10. The River and Harbor Act, of September 19, 1890, contained the following important proviso:

Provided, that such contracts as may be desirable may be entered into by the Secretary of War for the completion of the existing project, or any part of same, to be paid for as appropriations may from time to time be made by law.

As soon as possible thereafter a contract was made with the American Dredging Company for the completion of the improvement. The work was very vigorously prosecuted, and satisfactorily finished in December, 1892.

The total amount of material removed and redeposited under the contract was 6,219,179 cubic yards.

The channel is now 600 feet wide with a depth of 27 feet at mean low water, and the width being much greater at the turns.

Of course this channel will require repairs from time to time, like all artificial highways. The latest experience and a re-study of the conditions of the case, confirm the opinion and estimate made some years ago that the maintenance of the channel after completion will require the annual expenditure of \$50,000. This is, however, a small sum when contrasted with the great gain to Baltimore and her dependent interests, as well as in revenue to the United States Treasury, by the increase of the depth from 17 to 27 feet at low water, which means the introduction of many lines of deep ocean steamers to European and other foreign and domestic ports within the past twenty years, whereas there were none before of any importance. The expense of repairs is increased if they are not regularly and systematically made. The channel to Baltimore was finished in 1892 to a depth of 27 feet at mean low water. This depth cannot be maintained except with occasional work in the nature of repairs. No appropriation was made for such work in the year ending June 30, 1894, and no dredging can therefore be done. The appropriation now asked for is consequently for two years. The present small balance is held for an extraordinary contingency and necessary surveys after the completion of the work. These surveys are now in progress.

July 1st, 1892, balance unexpended \$ 66,310 15
 Amount appropriated by sundry
 civil Act, approved August 5th,
 1892, - - - - - 208,000 00

\$274,310 15

June 30, 1893, amount expended
 during fiscal year, - - - - - 253,698 09

July 1, 1893, balance unexpended, \$20,612 06
 July 1, 1893, outstanding liabilities, 800 00

July 1, 1893, balance available, - \$19,812 06

Amount that can be profitably ex-
 pended in fiscal year ending
 June 30, 1895, submitted in com-
 pliance with requirements of sec-
 tion 2 of river and harbor Acts
 of 1866 and 1867, and of sun-
 dry civil Act of March 3, 1893. \$100,000 00

2. Channel to Curtis bay, in Patapsco river, Baltimore harbor, Maryland. The river and harbor Act of 1892 contained the following item :

Improving Patapsco river, Baltimore harbor, Maryland: For dredging a channel 150 feet wide at the bottom and a depth of twenty-seven feet, mean low water, from the main ship channel to Curtis bay, in accordance with recommendation of Col. William P. Craighill, Corps of Engineers, submitted December 13, 1890, \$28,000.

The total estimated cost of the improvement was \$85,000. The first appropriation of \$28,000 has been expended in dredging to a depth of twenty-five feet at low water. The work, under a contract with the National Dredging Company, was commenced in November, 1892, and after considerable interruption by ice and severe weather, was satisfactorily completed in May, 1893. The channel is made 150 feet wide.

Amount appropriated by Act ap-
 proved July 13, 1892, - - - \$28,000 00

June 30, 1893, amount expended
 during fiscal year, - - - 28,000 00

Amount (estimated) required for
 completion of existing project, 57,000 00

Amount that can be profitably ex-
 pended in fiscal year ending June
 30, 1895, - - - - - 57,000 00

Submitted in compliance with requirements of section 2 of river and harbor Acts of 1866 and 1867, and of sundry civil Act of March 3, 1893.

IMPROVEMENT OF PATAPSCO RIVER AND CHANNEL TO BALTIMORE, MD.

The river and harbor Act of September 19, 1890, contained the following clause:

Provided, That such contracts as may be desirable may be entered into by the Secretary of War for the completion of the existing project, or any part of same, to be paid for as appropriations may from time to time be made by law.

By advertisement of September 30, 1890, proposals were invited for completing the channel to a width of 600 feet, with a depth of twenty-seven feet at mean low water, which were received December 2. The contract was awarded to the American Dredging Company, of Philadelphia, at 10½ cents per cubic yard for removal and redeposit, to cover 6,000,000 cubic yards of material. The time for completion of the work was June 1, 1893, but it was finished in December, 1892.

Work under the contract began February 17, 1891, and was continued vigorously, except when prevented by bad weather, until December 6, 1892, when it was completed. The channel is now 27 feet deep at mean low water, with a width throughout of not less than 600 feet, and more at the turns.

There have been excavated during the fiscal year, the following amounts of material:

	Cubic yards.
From Fort McHenry division.....	636,371
From Brewerton division.....	21,509
From Cutoff division.....	575,838
From Lower division.....	92,775
Total amount removed during fiscal year.....	1,366,493
Redeposited below Rock Point.....	250,093
Redeposited eastward of Lower division.....	1,076,400

Total removed under contract:

In year ending June 30, 1891.....	1,334,536
In year ending June 30, 1892.....	3,518,150
In year ending June 30, 1893.....	1,366,493
	<hr/> 6,219,179

FORT McHENRY DIVISION.

The area excavated in this division during the fiscal year were: On southwest side of channel, 10,820 by 55 feet, 36,

460 by 50 feet, 1,225 by 45 feet, 2,510 by 40 feet, 3,828 by 25 feet and 6,163 by 20 feet, or a total area on southwest side of 310,286 square yards; on northeast side of channel, the areas excavated were: 4,500 by 50 feet, 1,380 by 45 feet and 1,335 by 20 feet, or a total area on northeast of 34,866 square yards.

BREWERTON DIVISION.

The area excavated in this division was 4,055 by 40 feet, being removal of deposits within the 400-foot channel limits.

CUT-OFF DIVISION.

The area excavated in this division were: On southwest side 5,475 by 50 feet, 2,440 by $66\frac{2}{3}$ feet, and 22,140 by 45 feet, or a total area on southwest side of 160,716 square yards. There was also excavated in this division an area of about 90,000 square yards within the limits of the 400-foot channel.

LOWER DIVISION.

On the east side of this division there was excavated an area of 6,560 by 50 feet; in addition to this, an area of about 92,000 square yards was excavated within the limits of the 400-foot channel. All excavations mentioned are to a depth of twenty-seven feet at mean low water.

The Fort McHenry division, extending from city limits of Baltimore to the upper end of the Brewerton division, 28,500 feet long, with a minimum width of 600 feet, and at its upper end, for a distance of about 6,500 feet, its width is 800 feet.

Brewerton Division.—This division extends from the lower end of the Fort McHenry division to the upper end of the Cut-off division; it is 23,500 feet in length and 600 feet in width.

Cut-off Division.—This division is 23,100 feet in length, with a minimum width of 600 feet. It extends from the lower end of the Brewerton to the Lower division.

Lower Division.—This extends from the Cut-off division to deep water of the Chesapeake Bay; it is 2,400 feet long and 600 feet wide.

Angles.—At the junctions of the Fort McHenry and Brewerton, and of the Brewerton and Cut-off divisions, the maximum width is 1,000 feet, and at the junction of the Cut-off and Lower divisions the maximum width is 1,250 feet.

A re-survey is in progress of the whole area covered by the channel and to the shores on either sides.

It should not be forgotten that this channel, like all artificial highways, needs attention and repairs to keep it in proper order, and the amount of repairs and consequent cost will increase rapidly if not promptly attended to at the proper times, which is once every year.

The following are the amounts and dates of appropriations for improving harbor at Baltimore, Md., including Patapsco river :

August 30, 1852.....	\$ 20,000
August 15, 1856.....	100,000
June 23, 1866.....	5,200
March 2, 1867.....	75,000
July 25, 1868.....	17,000
April 10, 1869.....	26,730
July 11, 1870.....	42,900
March 3, 1871.....	50,000
June 10, 1872.....	100,000
March 3, 1873.....	200,000
March 3, 1875.....	75,000
August 14, 1876..	75,000
June 18, 1878.....	75,000
March 3, 1879.....	160,000
June 14, 1880.....	100,000
March 3, 1881.....	150,000
August 2, 1882.....	450,000
July 5, 1884.....	250,000
August 5, 1886.....	150,000
August 11, 1888.....	300,000
September 19, 1890.....	340,000
March 3, 1891.....	151,200
August 5, 1892.....	208,000
Total.....	\$3,121,030

IMPROVEMENT OF CHANNEL TO CURTIS BAY, IN PATAPSCO RIVER, BALTIMORE HARBOR, MARYLAND.

The river and harbor Act of 1892, contained the following item :

Improving Patapsco river, Baltimore harbor, Maryland: For dredging a channel one hundred and fifty feet wide at bottom, and of a depth of twenty-seven feet mean low water, from the main ship channel to Curtis bay, in accordance with recommendation of Colonel William P. Craighill, Corps of Engineers, submitted December thirteenth, eighteen hundred and ninety, twenty-eight thousand dollars.

The total estimated cost of the improvement was \$85,000. The first appropriation of \$28,000 has been expended in dredging to a depth of twenty-five feet at low water. The work, under a contract with the National Dredging Company, was commenced in November, 1892, and after considerable

interruption by ice and severe weather, was satisfactorily completed in May, 1893. The channel is made 150 feet wide.

**PRELIMINARY EXAMINATION OF SOUTH BRANCH OF
PATAPSCO RIVER. FROM CRAIGHILL CHANNEL TO
LIGHT STREET BRIDGE; AND OF MID-FOOT
OF EUTAW STREET, BALTIMORE
MARYLAND.**

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY.

WASHINGTON, D. C., *December 5, 1892.*

SIR: I have the honor to submit the accompanying copy of report, dated October 7, 1892, by Col. William P. Craighill, Corps of Engineers, concerning preliminary examination of South Branch of Patapsco river at Baltimore, Maryland, from Craighill channel to Light street bridge, and Middle Branch of Patapsco river from Light street bridge to foot of Eutaw street, provided for by the river and harbor Act approved July 13, 1892.

It is the opinion of Colonel Craighill, concurred in by this office, that these localities are worthy of improvement by the general government.

The local engineer states that no new survey is needed for the preparation of project and estimate of cost of improvement proposed.

Very respectfully, your obedient servant,

THOS. LINCOLN CASEY,

Brigadier-General, Chief of Engineers.

HON. S. B. ELKINS,

Secretary of War.

REPORT OF COL. WM. P. CRAIGHILL, CORPS OF ENGINEERS.

UNITED STATES ENGINEER OFFICE.

BALTIMORE, MD., *October 7, 1892.*

GENERAL: In obedience to your instructions, I have the honor to make the following report concerning the South Branch of Patapsco river, at Baltimore, Md., from Craighill channel to Light street bridge, and Middle Branch of Patapsco river, Md., from Light street bridge to foot of Eutaw street.

The growth of the city of Baltimore during the last fifteen or twenty years has caused such a development in the business section which is interested in those portions of the Patapsco river, as to justify me in saying in the words of the law that they "are worthy of improvement by the General Government."

"The facts and reasons" on which this opinion is based are personal examination of the streams and their surroundings, and conference with intelligent men engaged in business there.

The principal interests to be subserved by the improvement desired are those dependent on easy navigation for ships engaged in transporting coal, wood, ice, marble and the materials for the manufacture of glass and fertilizers. The present commerce is hampered by the want of greater depth of water, and the indications are good that there would be a decided increase of business if the existing channels were improved.

No estimate is now submitted of the amount that will enable me to make "a survey and report, including a project with estimate of the cost of the improvement proposed," as no further survey is needed. Existing maps are sufficient for the preparation of a project and estimate.

Very respectfully, your obedient servant,

WM. P. CRAIGHILL,

Colonel, Corps of Engineers.

BRIG. GEN. THOMAS L. CASEY,

Chief of Engineers, U. S. A.

The following are the widths of the respective branches of the channel June 30, 1885, with a depth of 27 feet at mean low water:

Craighill Channel,	-	-	-	300 feet.
Cut-off Channel,	-	-	-	300 feet.
Brewerton Channel,	-	-	-	250 feet.
Fort McHenry Channel,	-	-	-	250 feet.

Though the depth of 27 feet at low water has been reached and seems to suffice for present needs, the width is too little for easy or safe navigation by very large vessels, whose length is considerably greater than the width of the channel.

Up to June, 1884, the United States had expended \$2,084,489.12, with the results indicated above. The city of Baltimore and the State of Maryland, chiefly the former, had contributed to the same object, \$584,000.

Dredging was suspended June 30, 1885, owing to the failure of Congress to appropriate at the last session. The balance available must be held in hand, for use in case of emergency. Advantage has been taken of this absence of dredges to make a thorough resurvey of the whole channel. The results of this survey are not ready, but will be submitted in a special report if necessary.

July 1, 1885, amount available, -	\$ 70,463 65
Amount appropriated by Act approved July 5, 1884, - - - -	250,000 00

\$320,463 65

July 1, 1885, amount expended during fiscal year exclusive of outstanding liabilities July 1, 1884, - - - - -	29,617 24
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July 1, 1885, amount available, -	\$30,846 41
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Amount estimated required for completion of existing project, \$200,000 00	
Amount that can be profitably expended in fiscal year ending June 30, 1887, - - - - -	200,000 00

Submitted in compliance with requirements of section 2 of river and harbor Acts of 1866 and 1867.

The improvements made prior to September 30, 1897, are stated in the following extracts from the annual report of the Chief of Engineers to the Secretary of War.

IMPROVEMENT OF PATAPSCO RIVER AND BALTIMORE HARBOR, MARYLAND.

This district was in the charge of Col. Peter C. Hains, Corps of Engineers, having under his immediate orders, Lieut. Charles W. Kutz, Corps of Engineers, since October 2, 1896.

1. *Patapsco River and Channel to Baltimore, Maryland.* The original available depth from the deep water of the Chesapeake bay to Baltimore was 17 feet at mean low water. The

average rise of tide is 18 inches. Vessels of 17 feet draft and over were obliged to lighter portions of their cargoes to the Baltimore wharves from about fourteen miles below the city.

In 1853, the original project was adopted for a depth of 22 feet at mean low water and a channel width of 150 feet. In 1871, (Annual Report, Chief of Engineers for 1871, pages 586-587,) an estimate was made for a channel of 400 feet wide at its lower end, narrowing to 250 feet wide at its upper end, to be twenty-four feet deep at mean low water. In July, 1872, (Annual Report Chief of Engineers, for 1873, page 761,) this work was commenced, and in 1874, was completed. A change in the position of the channel was also made, which lessened the distance and decreased the cost of maintenance. In 1892, the channel was completed to twenty-seven feet depth at mean low water, 600 feet wide in the straight parts, and over 1,200 feet at the bends, that project having been authorized by Congress in the Act of March 3, 1881, (Annual Report Chief of Engineers, for 1881, pages 134, 860-863.) This project also included a change in the direction of the channel, called the Cut-off. One hundred thousand dollars in all was appropriated to maintain the channel after its completion. The Act of June 3, 1896, contained the following:

Improving deep channel in Baltimore harbor, Maryland, in accordance with the project submitted December first, eighteen hundred and ninety-four, four hundred thousand dollars; provided, that this sum may be used in the discretion of the Secretary of War, under the direction of the Chief of Engineers, for deepening the present channel to a depth of thirty feet.

The existing project under the above law was approved by the Secretary of War, July 10, 1896. It provides for a channel thirty feet deep at mean low tide, with a bottom width of 600 feet, widened in the bends, and side slopes of the three base to one vertical, from Fort McHenry to the deep water in Chesapeake bay, near Sandy Point light-house. The estimated cost is \$2,500,000, with an annual expenditure of \$50,000 for maintenance.

The amount expended up to the close of the fiscal year ending June 30, 1896, was \$3,261,154.17. The sum given is the result of a revision of the finances from the beginning of the work.

June 30, 1896, the dimensions of the channel were 27 by 600 feet, as stated above, but this was found inadequate to

the demands of the commerce of the port. Freight-carrying vessels and general marine architecture are tending toward an increase in bulk and draft.

With the funds provided by the Act of June 3, 1896, a cut is being dredged to 30 feet depth in the middle of the existing channel. The work was thus far accomplished under the new project to June 30, 1897; and consists in the removal, under contract, of 1,270,582 cubic yards of material, but the cut then made was not fully available for the purposes of navigation and commerce at the end of the fiscal year.

The value of the annual commerce of the port in 1853, when this improvement was commenced, amounted to \$20,000,000, and in the fiscal year ending June 30, 1897, it is \$95,822,330, showing an increase of \$75,822,330 as a resultant of the 27-foot improvement.

The tonnage movement of the port has been as follows:

Fiscal year ending June 30.	Tons.	Fiscal year ending June 30.	Tons.
1889 ...	3,243,017	1894....	4,752,946
1890....	4,237,361	1895....	4,794,964
1891....	4,495,469	1896....	5,363,894
1892....	5,224,042	1897....	6,868,120
1893....	4,607,176		
July 1, 1896, balance unexpended.....			\$454,875 83
June 30, 1897, amount expended during fiscal year....			72,149 06
July 1, 1897, balance unexpended.....			\$382,726 77
July 1, 1897, outstanding liabilities.....		\$500 00	
July 1, 1897, amount covered by uncom. contracts...		337,575 71	
			<u>338,075 71</u>
July 1, 1897, balance available.....			<u>\$44,651 06</u>
Amount (estimated) required for completion of existing project.....			\$2,100,000 00
Amount that can be profitably expended in fiscal year ending June 30, 1899.....			800,000 00

Submitted in compliance with requirements of section 2 of river and harbor Acts of 1866 and 1867, and of sundry civil Act of June 4, 1897.

2. *Channel to Curtis Bay, in Patapsco River, Baltimore Harbor, Maryland.*—Curtis Bay was originally a nearly circular harbor, about four miles below the city of Baltimore, with a natural depth of twenty-two feet at mean low water. It required connection with the main ship channel to Baltimore to be available for the deep-draught vessels using the port.

The originally adopted project (Annual Report, Chief of Engineers, 1893, page 1249,) was for a channel 150 feet wide at bottom and a depth of twenty-seven feet at mean low water

from the main ship channel in the Patapsco River to Curtis Bay, at a cost of \$85,000. A channel of that width, but of twenty-five feet depth, was completed in 1893 with an appropriation of \$28,000, made in 1892.

The amount expended up to the close of the fiscal year ending June 30, 1896, was \$28,000.

The channel dredged, answers all present needs of the navigation and commerce of the bay, and the appropriation of \$12,000 in the Act of August 17, 1894, is unexpended.

Nothing was expended in the fiscal year ending June 30, 1897, and the channel remains with the same dimensions as at June 30, 1896.

Curtis Bay is in the collection district of Baltimore. Owing to the destruction by fire of a sugar refinery there, its commerce has not increased since the existing channel was completed, although the refinery has been reconstructed.

July 1, 1896, balance unexpended - - - \$12,000

July 1, 1897, balance unexpended - - - 12,000

Amount (estimated) required for
completion of existing project.

Submitted in compliance with
requirements of section 2 of
River and Harbor Acts of 1866

and 1867 - - - - - 45,000

3. *Harbor of Southwest Baltimore, (Spring Gardens,) Md.*—

The original condition of the navigable channel way was that it had a controlling depth of fifteen feet at mean low water in one portion, although the depth was greater in others. The width was contracted, but varying, the least being about 100 feet. Navigation was not available for the deep-draught vessels of the port of Baltimore.

The originally adopted project (Annual Report, Chief of Engineers, 1896, pages 1005, 1006 and 1007,) was for a channel twenty-seven feet deep at mean low water, 100 feet wide at bottom, with side slopes of one on three from the main ship channel near Fort McHenry to the foot of Eutaw street, with a turning basin of 400 by 400 feet near the upper end, at an estimated cost of \$314,000.

There had been no expenditures up to the close of the fiscal year ending June 30, 1896.

The condition of the improvement June 30, 1896, is as stated in the first paragraph.

There were no operations in the fiscal year ending June 30, 1897, the appropriation of \$5,000, in the Act of June 3, 1896, being too small to accomplish any useful result.

This harbor is in the collection district of Baltimore, and the commercial statistics of that port include it.

Amount appropriated by Act of	
June 3, 1896, - - -	\$ 5,000 00
July 1, 1897, balance unexpended,	5,000 00
Amount (estimated) required for	
completion of existing project,	309,000 00
Amount that can be profitably ex-	
pended in fiscal year ending June	
30, 1899. Submitted in com-	
pliance with requirements of sec-	
tion 2 of river and harbor Act	
of 1866 and 1867, and of sundry	
Act of June 4, 1897 - - -	100,000 00

4. *Removing Sunken Vessels or Craft Obstructing or Endangering Navigation. Schooner Margaret Kennedy.*—This vessel was wrecked off Fort Henry, Baltimore harbor, Maryland, in 1895, and had been a menace to the navigation of small craft. After due advertisement, the wreck was removed by the lowest bidder, at a cost of \$125. The work was completed February 24, 1897.

SURVEYS MADE IN COMPLIANCE WITH RIVER AND HARBOR ACT OF JUNE 3, 1896.

The surveys of the following localities, required by the Act of June 3, 1896, were made by the local engineer, Col. Peter C. Hains, Corps of Engineers, and reports thereon submitted:

1. *Survey of Baltimore Harbor, Maryland, with a View to Securing a Channel, 30 Feet in Depth.*—Colonel Hains submitted report, October 17, 1896. No survey was necessary at this time, but from data available, the local officer estimates that to deepen the channel to thirty feet at mean low water, with a bottom width of 600 feet and side slopes of three base to one vertical, will cost \$2,500,000. To maintain the channel after completion, will require an annual expenditure of \$50,000. The report was transmitted to Congress and printed in House Doc. No. 50, fifty-fourth Congress, second session.

2. *Survey of Annapolis Harbor, Maryland, with a View to Straightening, Widening, and Deepening the Channel of the Entrance*

to said Harbor, so as to obtain a Ship's Channel of 150 feet wide and "—feet Deep at Mean Low Water, from Chesapeake Bay to the Wharves of the United States Naval Academy in said Harbor. Colonel Hains submitted report November 28, 1896. He states that there can be no question that the only practicable way to improve the navigation in the manner required by the Act is to dredge a channel from the deep water of the bay to the inner harbor, and estimates, that to dredge a channel three and one-half miles long, with side slopes one to three, and twenty-eight feet deep at mean low water, will cost \$142,000. The report was transmitted to Congress, and printed in House Doc. No. 57, fifty-fourth Congress, second session.

CHAPTER VI.

WHOLESALE TRADES OF BALTIMORE, 1897.

I present herewith a carefully prepared statement, giving in detail, as far as possible, the wholesale business of the city of Baltimore for the year 1897. It includes the grain trade, with its wonderful and magnificent showing for the year; tobacco, with its greatly increased receipts and sales; exports and imports; coffee trade, shipbuilding, canned goods, dry goods, drugs, chemicals, etc. In almost every instance a substantial increase in trade is noted, and the outlook for the future is brighter than for several years. Altogether it shows a most encouraging state of affairs, that cannot fail to be gratifying to the citizens of Baltimore, in particular, and the people of the State in general.

DRY GOODS.

In this line of trade the transactions show a gratifying increase as compared with 1896, notwithstanding the extreme low prices of cotton goods, which necessarily greatly reduced the aggregate amount of sales. The advance in the prices of woolen goods, however, offset this. Owing to the operations of the new tariff bill, the price of all woolen goods has advanced during the year fully twenty per cent., and if the present conditions continue, a further advance of at least fifteen per cent, is anticipated. There is nothing in sight to warrant the expectation of any rise in the cotton product market. Baltimore dry goods merchants have an extensive market for their goods in the cotton, tobacco and grain raising regions. In the cotton section, while the prices have been low, the crop has been large, and consequently, a large amount of new money has been put in circulation among the planters. In the grain and tobacco growing regions, there have been abundant crops and greatly increased prices, therefore, largely increasing the purchasing power of the farmers.

These factors have all contributed directly to the increase of trade in this line of business in 1897, and the indications are for a largely increased business in 1898. This is the impression of those familiar with the workings of the trade, and they say that there seems to be a better condition of affairs than has existed for years.

BANKS.

The business transacted by its banking institutions is always one of the best and most infallible tests of a city's prosperity. A look into the operations of Baltimore banks for the year, shows a material increase in the volume of business as compared with 1896, as the following table will show:

1897.

Capital.	Surplus and Undivided profits.	Loans and Discounts.	Deposits.
\$ 14,446,760	\$ 6,827,323	\$ 36,872,356	\$ 37,176,012

1896.

\$ 14,418,260	\$ 6,478,255	\$ 34,502,800	\$ 34,318,141
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The remarkable increase in the bank clearances during 1897, is an indubitable evidence of the great increasing volume of Baltimore's business transactions. The said increase on clearances amounted to upwards of \$75,000,000, and was a "record breaker" in the history of the city.

Subjoined will be found the figures for the past ten years, which show how the business of the city has been increased in that time.

1897.....	\$ 795,688,363
1896.....	720,089,733
1895.....	695,707,281
1894.....	673,443,512
1893.....	705,733,232
1892.....	769,355,889
1891.....	735,714,652
1890.....	753,095,093
1889.....	650,583,571
1888.....	620,587,729

CLOTHING.

There has been a decided increase in the volume of business in this line during 1897, as compared with several preceding years. A conservative estimate, places the increase at about 25 per cent., which would have been considerably more had it not been for the low price of cotton and the ravages of yellow fever in the South. There is in addition to the increase in the sales, an increase in values, estimated at about 40 per cent. in the last few months. This latter is due to the increased duties under the new tariff law.

Orders for the spring trade are already in hand and being filled, and the outlook for 1898, is said to be better than for years past. This industry is one of the largest and most

important in Baltimore, operating numerous large factories and giving employment to thousands of men and women, to whom the prosperity of the trade means so much. It is to be hoped, that in the near future, the employes will be made sharers in the prosperity of their employers, by a liberal increase of wages.

SHOES AND LEATHER.

The bulk of Baltimore's trade in these lines is with the South, and, consequently, owing to the causes already enumerated, business during 1897 has only been fair. Especially has this been the case in the shoe trade, which has not yet rallied from the depression, which existed in 1896. One indication of improvement, however, is the maintenance of values in accord with the increase in the prices of leather. The aggregate of Baltimore's shoe business for 1897 is estimated at about \$20,000,000.

The new tariff law has materially advanced the price of leather, and the volume of business for 1897 shows an increase of about twenty per cent., as compared with 1896. The disappearance of some of the unfavorable conditions in the South, and the general revival of business throughout the country, give strong grounds for the hope and expectation that business in both the shoe and leather trade will show a material increase during 1898.

LEAF TOBACCO.

The crop of Maryland tobacco for 1897 was 34,873 hogsheads, an increase of 5,244 hogsheads, as compared with 1896, and the medium and better grades sold at satisfactory prices to the grower, viz.: 13 and 14 cents per pound. The commoner qualities sold at extremely low prices at the beginning of the season, but later on it was found that the crop of this sort of tobacco was short, and the stock on hand was quickly disposed of at advanced prices. The Ohio crop of 8,000 hogsheads was all handled and sold by Baltimore dealers, at fair prices. The finer qualities were in demand and brought good prices.

The stock on hand of Maryland and Ohio, tobacco at the warehouses January 1, 1898, was 16,844 hogsheads. The sales during the year were 44,517 hogsheads, an increase of 11,444 hogsheads over 1896.

CANNED GOODS.

The pack of green peas in 1897 was something phenomenal, the packers taking advantage of the low prices of this vegetable to put up an extraordinary quantity. They were

sold at correspondingly low rates, and the stock on hand now is nearly exhausted. Owing to poor crops, the pack of corn, peaches and tomatoes was correspondingly small, and the stock is now nearly out of the hands of the packers, who realized better prices than has been obtained for these goods for several years past. It is thought that there will be a material advance in the prices in the spring of 1898.

The oyster packing has been good, although it has been carried on at a greater cost to the packer, owing to the falling off in the supply of the cheaper grades of oysters from the bay. Nevertheless, some of the packers have canned all they could get, and found ready sale for them as soon as packed. A large quantity have also been sold ahead, and the stock on hand is small. There seems to be a bright future ahead for the canning industry, as the revival of business throughout the country is sure to cause a much larger demand for the canned goods.

COFFEE.

During the year 1897 there was imported at Baltimore 203,066 bags of coffee, an increase of 55,458, as compared with 1896. The principal feature has been the uninterrupted downward tendency of prices during the year, in the early part of which No. 7 coffee opened at $10\frac{1}{4}$ cents, and constantly declined until the latter part of December, when it closed at $6\frac{3}{4}$ cents. The sales and volume of business show, however, a marked increase over 1896, and the new year opened with a firmer market and indications of better prices in the near future.

COTTON.

The receipts of this staple at Baltimore for 1897 were 265,043 bales, an increase of 1,105 bales as compared with 1896. The exports were 176,616 bales, an increase of 11,678 bales over the preceding year. The mills in Baltimore and vicinity used about 64,000 bales during the year. The prices continue depressed, and the figures for "middling" in Baltimore ranged from 7 cents per pound in January to $5\frac{5}{8}$ cents in the latter part of December.

The total estimated crop for 1897 of the United States was 10,300,000 bales. The situation at the New England mills and the limited demands of the English spinners have had much to do with the state of depression which exists in the cotton trade.

CATTLE.

The receipts of cattle for the year were 161,078, an increase of 13,969 over 1896. Sheep 387,019, a decrease of 5,898; hogs 823,061, an increase of 25,058.

SHIPBUILDING.

This trade was quite brisk during the year, both in the construction of new vessels and in the repair of old ones. There were thirty-nine new vessels built of various types, an increase of twenty as compared with 1896. Their total tonnage was 8,377 tons, an increase of 3,294 tons over the preceding year. Their total cost was \$631,175, while those built in 1896 cost only \$327,799. Among the new vessels were two torpedo-boats for the United States Navy and the sub-marine wrecking-boat Argonaut, all built at the Columbian Iron Works. The new year opened with a promise of still greater activity. Several new vessels are under contract, among which are a steel revenue cutter, a torpedo-boat, three large steel tugs, one wooden tug, a large steel steamer and a number of lighters. There is also an unusual amount of repair work on hand, and the yards all present a busy appearance.

BUILDING PERMITS.

While there was not any boom in building operations during the year, there was a gratifying increase in the number of building permits issued by the Appeal Tax Court, as the following figures will show:

Wards.	New Buildings. 1897.	New Buildings. 1896.	Additions. 1897.	Additions. 1896.
1.....	62	151	43	50
2.....	9	9	30	16
3.....	5	4	23	14
4.....	7	8	21	26
5.....	19	13	19	12
6.....	262	8	34	16
7.....	114	331	34	43
8.....	103	48	31	14
9.....	11	11	48	13
10.....	16	14	17	15
11.....	12	9	20	18
12.....	40	55	30	25
13.....	5	4	14	2
14.....	2	6	20	8
15.....	6	9	27	11
16.....	4	7	17	8
17.....	212	123	40	30
18.....	121	125	40	30
19.....	279	265	19	31
20.....	91	45	21	17
21.....	800	467	50	43
22.....	668	660	41	53

LICENSES.

There were 18,304 licenses issued by the Clerk of the Court of Common Pleas for all kinds of business in 1897, and the amount received from this source was \$699,283.04. The following is a classified list of the licenses issued:

Licenses.	Amounting to.
9,515 Trades.....	\$110,402 78
2,081 Saloon.....	513,875 00
36 Hotel.....	8,500 00
39 Retail Grocers' Liquor.....	9,750 00
70 Wholesale Liquor.....	17,208 35
18 Bottlers.....	700 00
46 Hotel, ordinary.....	6,076 68
162 Billiard Table.....	4,777 30
1,059 Cigarette.....	9,825 62
215 Real Estate Brokers.....	4,662 73
6 Exchange Brokers.....	591 67
7 Bill Brokers.....	350 00
107 Grain, Stock, etc., Brokers.....	2,987 50
6 Horse Brokers.....	266 69
4 Pawn Brokers.....	2,000 00
25 Oyster Packers.....	625 00
10 Oyster Commission Merchants.....	250 00
49 Oyster Measurers.....	980 00
3 Chesapeake Bay Fishery.....	15 00
15 Peddlers.....	591 72
8 Exhibitions.....	24 00
4,823 Marriage.....	4,823 00
18,304—Total.....	\$699,238 04

EXPORTS AND IMPORTS.

The year 1897 was the greatest ever known in the history of the export trade of Baltimore, all previous records having been eclipsed and left far behind, and this magnificent result has been achieved by our merchants, despite the jealousy and sharp competition of rival cities. Baltimore now ranks second in wheat exports, and is ahead of all other ports in shipments of corn. The grain trade of the port is constantly increasing, and that, too, at a rate relatively faster than that of competing ports.

During the year there were exported 15,178,649 bushels of wheat, an increase of 8,620,194 bushels over 1896. Of corn, 42,692,087 bushels were shipped, an increase of 17,092,212 bushels. Of rye there was shipped 3,418,669 bushels, an increase of 2,424,209 bushels, and of oats there was reported

5,244,164 bushels, which shows a small decrease, as compared with 1896. Flour was reported to the amount of 2,287,130 barrels. In addition to the great increase in the breadstuff trade, there has also been handsome gains in the trade in lard, provisions, glucose, copper, lumber and tobacco.

The figures given below show that since 1885 the exports from Baltimore have nearly tripled, the year 1897 showing an increase over 1896 of about \$16,500,000.

Year.	Imports.	Exports.
1885.....	\$11,193,695	\$34,748,264
1886.....	11,785,113	46,810,870
1887.....	13,055,880	49,545,970
1888.....	12,098,629	45,099,334
1889.....	15,409,234	62,077,610
1890.....	15,339,312	72,120,083
1891.....	18,270,000	79,475,125
1892.....	14,258,570	93,126,389
1893.....	14,858,621	73,153,487
1894.....	11,749,927	63,961,279
1895.....	19,934,369	60,171,591
1896.....	10,208,741	81,508,836
1897.....	11,107,467	98,017,776

The imports for the year amounted to \$11,107,467, an increase of \$898,726 as compared with 1896.

Following is a classified list of the imports for the years 1896 and 1897.

Imports.	1897.	1896.
Iron ore, tons.....	289,558	365,903
Tin plate, pounds.....	1,343,921	17,626,109
Salt, tons.....	17,256	20,301
Rice, pounds.....	10,204,244	7,666,375
Coffee, pounds.....	28,015,641	17,916,180
Cement, pounds.....	81,874,303	119,999,442
Bananas, dollars.....	490,027	102,195
Muriate potash, pounds.....	13,896,565	11,988,454
Phosphate, tons.....	1,100	1,981
Sugar, pounds.....	37,243,696	36,993,831
Brimstone, tons.....	14,788	10,385
Matting, dollars.....	216,911	104,207
Licorice root, pounds.....	9,197,024	8,401,771
Chloride lime, pounds.....	6,908,625	8,775,618
Tea, pounds.....	133,115	160,663
Caustic soda, pounds.....	5,315,738	3,670,093
Soda ash, pounds.....	14,918,983	33,742,576

The receipts at the custom house were \$228,711, an increase of \$25,104 over 1896.

During the year 1,023 vessels sailed for foreign ports, carrying 1,656,928 tons of cargo. In 1896, 817 vessels sailed carrying 1,320,377 tons. There sailed for coastwise ports in 1897, 2,138 vessels with 2,143,104 tons of cargo, and in 1896, 2,125 vessels with 2,086,788 tons of cargo.

INCORPORATIONS.

A very encouraging feature and a sign of the general improvement in business, was the number of incorporations for business enterprises, and 160 such were recorded at the clerk's office of the Superior Court. Of these, 133 were for mercantile, manufacturing and various trade purposes, the aggregate capital invested to be \$5,490,000. The remaining twenty-seven corporations, with a capital of \$44,111,100 were building and saving associations, etc. Among the mercantile and manufacturing enterprises some of the more prominent are given as follows:

	Capital.
• Rivers Furniture Company	\$25,000
Raymond Button Company,	110,000
The Baltimore Tin Plate Company,	100,000
Biemiller Ice & Coal Company,	120,000
Kahn-Miller Drug Company,	12,000
Maryland Telephone Company,	200,000
The Standard Manufacturing Company,	125,000
Baltimore, North Point & Bear Creek Railway Co.,	300,000
Aerostatic Power Company,	200,000
Maryland Oil Company,	25,000
American Toy Company,	30,000
Worthington National Granite Company,	50,000
Walbrook & Gwynn's Falls Railway Company,	50,000
Sneeringer Tobacco Company,	30,000
Delmarva Manufacturing & Lumber Company,	20,000
Baltimore Blind Company,	50,000
Monumental Glass Company	10,000
Pitt Brothers Company,	10,000
G. Fred Krantz Company,	15,000
Baltimore Security & Trading Company,	10,000
Port Deposit & Havre de Grace Steamboat Company,	55,000
Ames & Fentress Company,	10,000
El Arte Cigar Manufacturing Company,	25,000
Patten Cigar Company,	10,000

Maryland Veneer & Basket Company,	20,000
Henrietta Window Glass Company,	100,000
Iron Milk Company,	20,000
Columbian Manufacturing Company,	25,000
Richmond Hot Water Radiator Company,	15,000
Welch Corrugated Roller Company,	25,000
National Arms Company,	50,000
W. L. Armiger Manufacturing Company,	50,000
J. H. Seward Importing Commission Company,	100,000
Peuss Oil Works,	12,000
Baltimore, Annapolis & Drum Point Telegraph Co.,	12,500
Coale Brass Manufacturing Company,	15,000
Structural Iron Company,	50,000
Murphy Manufacturing Company,	50,000
Kirwan-Schall Fruit Company,	20,000

Among the Building, Land and Loan Companies, etc., are: Carroll Park Building and Loan Association, \$100,000; South Fremont Avenue Loan and Savings Association, \$15,000; City and Suburban Realty Investment Company, \$200,000; J. F. Wiessner Building Association, \$200,000; Mount Holly Land and Improvement Company, \$40,000; Annex Building Association, \$200,000; Fidelity Building, Loan and Savings Association, \$2,600,000; Hearth and Home Perpetual Building Association, \$390,000; East Baltimore Building and Loan Association, \$1,500,000; The J. B. Brown Company, \$30,000; Frick Export Company, \$15,000; Burt Labeling Machine Company, \$100,000; Defiance Shoe Manufacturing Company, \$10,000; Sundry Manufacturing Company, \$10,000; Monumental Trading Company, \$25,000; Pitcher & Creager Brick Company, \$10,000; Ringrose Car Mover Manufacturing Company, \$50,000; Postmasters' Supply Company, \$10,000; Bagby & Rivers Furniture Company, \$50,000; American Fastener Company, \$50,000; Waterman Spring Bottle Seal Fastener Company, \$25,000; Pancoast Manufacturing Company, \$100,000; The Only Bob Horse Shoe Rubber Company, \$50,000; L. Hehl Company, \$15,000; Canton Box Company, \$60,000; Keen & Hagerty Manufacturing Company, \$250,000; William P. B. Schmitt Furniture Company, \$20,000; Maryland Paper Manufacturing Company, \$75,000; Maryland Cement Company, \$50,000; Faultless Roller Brake Company, \$10,000; Standard Brewing Company, \$150,000; Philip Hiss Company, \$30,000; Lazaretto Guano Company, \$300,000; Stevenson Company, \$30,000; Beardsley Car Brake Company, \$100,000.

INTERNAL REVENUE.

The receipts at the office of the Collector of United States Internal Revenue for Maryland, in 1897 were \$4,503,779.02, a decrease of \$2,035,730.67 as compared with 1896. This large falling off is in distilled spirits, and is entirely due to the closing of the bonded warehouse of E. A. Alexander, in which was stored a great quantity of spirits, distilled outside of the State, but the tax on which was paid in Maryland. In other articles, however, there was an increase as the following figures show:

Tax on beer, \$927,599.05; in 1896, \$833,160.95 an increase of \$94,438.10. The tax paid on cigars in 1897, was \$332,810.74, and in 1896, \$281,073.20, an increase of \$51,737.54; on tobacco, \$601,438.29 in 1897, and \$533,414.85 in 1896, an increase of \$68,023.44. Special taxes showed an increase of \$3,107.20; oleomargarine, \$1,004.10, and bottled spirits, \$172.

POST OFFICE BUSINESS.

The large increase in the business transacted at the Baltimore Post Office during the year, is an additional and most convincing proof of the growth of the trade of the city. The subjoined table gives a comparative statement of the receipts of the office for the respective quarters in the years 1896 and 1897:

QUARTERS ENDING.	1897.	1896.
March 31.....	\$234,467 29	\$225,609 34
June 30.....	226,712 57	214,019 81
September 30.....	227,978 77	204,631 10
December 31.....	263,672 46	236,068 68
TOTALS.....	\$952,831 09	\$880,328 93

Total increase for 1897, \$72,502.16, or 8½ per cent.

There were 234,024 money orders issued as against 219,931 in 1896, an increase of 14,093 amounting to \$9,457.12. There were 594,341 pieces of registered mail matter handled during the year, an increase of 14,427 pieces over 1896. In the city, there were delivered in 1897, 89,820 "special delivery" letters and parcels, an increase of 7,374 pieces as compared with 1896.

There were delivered through the city division of the office in 1897, 96,838,780 pieces of mail matter, an increase

of 9,802,774, as compared with 1896. This huge amount of mail matter was distributed as follows:

By carriers,	-	-	-	90,636,070	pieces.
Box department,	-	-	-	5,046,011	"
Special delivery,	-	-	-	89,820	"
General delivery,	-	-	-	529,001	"
Inquiry division,	-	-	-	537,878	"

The first-class matter dispatched in 1897 amounted to 75,252,200 pieces, an increase of 2,453,560 over 1896.

Special delivery letters dispatched amounted to 51,461, an increase of 4,024 over 1896.

All other classes of mail matter dispatched amounted to 32,788,990 pieces, an increase of 703,707, as compared with 1896.

There was, therefore, a total of 108,092,651 pieces of mail matter sent from the office in 1897, an increase of 3,161,291 pieces over 1896. The weight of the immense amount of mail matter was 4,295,958 pounds, an increase of 167,103 pounds.

During the year, there was a grand total of 205,525,772 pieces of mail matter handled, an increase of 12,978,492, as compared with 1896.

BITUMINOUS COAL.

There has been a great revival in the trade of bituminous coal during the year, and the shipping trade has been more active than for years past. The total output in the mines of the Cumberland-George's Creek region, for the year, was 3,788,230 tons, and the receipts at Baltimore exceeded those of 1896 by 267,929 tons, the total receipts here being 2,115,615 tons.

This improved state of affairs is in a large measure owing to the greatly enlarged transportation facilities offered by the railroads, and the partial substitution of large barges for vessels in carrying coal to the New England ports. There has also been a large increased demand for this class of coal for shipment to the Pacific coast. The outlook for 1898 is considered very bright by those well posted in the trade.

MILLINERY.

The wholesale millinery trade of Baltimore has assumed large proportions, approximating \$2,500,000 annually. During the year 1897 there has been a very appreciable increase

in business, especially in the cheaper lines, and it is thought that the trade in 1897 came very close to the \$3,000,000 mark. Millinery may be in a measure classed among the luxuries, and an increase in its sale is a sure indication of better times. The increase in the trade, although marked, would doubtless have been much greater, but for the yellow fever and the depressed cotton market in the South.

DRUGS AND CHEMICALS.

Business in this line has shown a marked and gratifying improvement during the year 1897, and the outlook is decidedly encouraging for 1898. Baltimore is without doubt one of the best points in the country for the reception and distribution of crude drugs, both foreign and domestic. It is the chief market in the United States for May-apple, Lady Slipper and Stillinger root, Stramoni leaves and other native herbs and roots.

The sales of proprietary medicines made in Baltimore have also been large, showing considerable improvement over 1896.

Fertilizer and chemical factories also report improved business coupled with an encouraging outlook for 1898.

GLASS.

Owing to the protective features of the new tariff law, glass manufacturers report a decided improvement in business. Foreign competition having been thus restricted, there has been a much larger demand for home manufactured goods and better prices have been obtained.

As stated elsewhere in this report, this improved state of affairs has enabled the manufacturers to increase the wages of their hands, a very acceptable and gratifying act to the latter. The increase in the business has not in any way partaken of the nature of a boom, or a sharp rise in prices, but there has been a steady demand, a sure indication of a healthier state of the market. The glass bottle business in Baltimore, for causes given in another part of this book, still continues depressed.

RAILROAD RECEIPTS.

The receipts of freight at Baltimore over the Baltimore and Ohio Railroad for the years ending November 30th, 1897 and 1896, were as follows:

	1897.	1896.
Wheat, bushels.....	8,280,875	2,393,928
Corn, bushels.....	24,678,184	16,443,580
Other Grain, bushels.....	7,866,514	9,964,069
Flour, barrels.....	1,385,427	1,915,078
Lumber, tons.....	177,286	182,906
Coal and Coke, tons.....	2,112,615	2,015,486
Animal Products, bushels.....	94,945	106,097
Cotton, bales.....	7,498	1,558

THE RECEIPTS PER THE WESTERN MARYLAND RAILROAD, WERE:

	1897.	1896.
Coal, hard, tons... ..	35,402	39,410
Coal, Bituminous, tons.....	2,877	6,860
Lumber, tons.....	2,063	3,132
Grain, tons.....	31,418	9,964
Miscellaneous, tons... ..	59,620	62,305
Lime and Limestone, tons.....	335	284
Wood, tons.....	244	746
Live Stock, tons.....	8,471	9,106
Flour, barrels.....	80,724	62,415
Fertilizer, tons... ..	355	258
Cotton, bales.....	793	1,109

The year's business of the Northern Central Railway has not been tabulated as yet, but the net earnings for the eleven months ending November 30, 1897, were \$1,902,638.63, as compared with \$1,518,207.38 for the corresponding period in 1896, an increase of \$384,431.25, an encouraging and gratifying exhibit.

HATS AND STRAW GOODS.

Business in this line was depressed in 1897, being hardly equal to that of the preceding year. This, in a large measure, is attributed to the short season, as there were no known special causes in the general condition of the trade to produce such a result. The loss was not confined to any special territory, as it was felt in the sections toward the North, as well as in the South, where Baltimore's chief trade in this line of goods lies. The outlook is said to be more encouraging for 1898. There are about 1,300 hands employed in this

business, with an output of over 200,000 dozens of hats, valued at about \$2,000,000.

OYSTERS.

The year 1897 was characterized by an immense catch of oysters, but there has been a serious depression of prices contingent, no doubt, upon a combination of unfavorable circumstances. A large stock of oysters was brought to market in the early fall, at a time when the lingering of warm weather almost entirely prevented any demand. Then, too, this offered supply contained an unusual quantity of uncultured oysters. These two untoward facts demoralized prices and sent them to the lowest notch.

The trade in the spring of 1897 was also dull, and this, coupled with the state of affairs in the fall, has doubtless greatly diminished the year's cash returns. Some of the causes leading to this state of affairs can be prevented by Legislative enactment, and should this protection be given, the year 1898 will, in all probability, far excel its immediate predecessor, and the city of Baltimore made secure in its position as the chief oyster market in the world, for which it is so justly famed.

A recent article in one of the daily papers, in speaking of the falling off of the oyster trade, says: "To some people the mere mention of a successful rivalry against Maryland in the oyster business sounds absurd. But cold facts and bitter experience have demonstrated that such a possibility is far from ludicrous. It is an actual and menacing reality, so serious in fact, as already to affix its impress upon the average of Maryland's business. States north of us have sent oysters, oysters of a fine flavor and splendid development, right into Baltimore's markets, there to successfully compete with the home product. And what has made this fact all the more remarkable, the very beds which have dared to thus meet us in a battle for supremacy, are beds which under the *existing laws* are fed, nourished and replenished from the oysters of the Chesapeake Bay.

In other words, bottoms of that splendid sheet of water are furnishing means for the sustenance of a rival, which threatens the ruin of our own supremacy. As the Northern trade has grown, so proportionately has the home trade diminished. And this home trade will continue to be affected, unless some means of protection are soon devised."

INSURANCE.

The various branches of insurance, namely, fire, life and accident, have had an active year. The receipts for the year for taxes and licenses at the office of the State Insurance Commissioner were \$138,390.87, an increase over 1896, of \$9,390.78. From brokers' licenses the receipts were \$9,191.68, an increase of \$2,233.35. The fee account shows an increase of \$3,925.50, making a total increase in the receipts of the office, over 1896, of \$15,449.63.

CHAPTER VII.

INDUSTRIES OF THE STATE OF MARYLAND.

Subjoined will be found a list of the agricultural, manufacturing and mechanical industries of Maryland and the city of Baltimore. It has been compiled with much care and labor from the best data available, and is as correct as possible under the circumstances. The various industries will be found classified in alphabetical order. It contains, in addition to mills, factories and workshops, the number of large employers of labor, including the large corporations, contractors, builders and other employers.

In that portion devoted to the State at large, will be found a table, giving the number of farmers in each county of the State.

The city list is as follows:

CITY OF BALTIMORE.

A.

Abattoirs, 2; acid works, 2; artificial-stone factories, 6; awls and needle works, 1; awning makers' shops, 12.

B.

Badge manufacturers, 4; bag factories, 8; bakeries, 566; baking powder works, 5; banner and flag factories, 2; basket factories, 43; beds and bedding factories, 8; beer pump manufacturers, 3; bell foundries, 2; belting factories, 3; bicycle factory, 1; bicycle legging manufacturers, 1; billiard and pool table factories, 3; bitters factories, 3; bleech works, 5; blacksmiths, 150; blank book manufacturers, 9; blow pipe manufacturers, 1; blue manufacturers, 8; boat builders, 12; boiler cleansing compound manufacturers, 2; boiler makers, 14; bolt and nut works, 3; bone-black factory, 1; book binderies, 22; boot and shoe factories, 20; boot, shoe and gaiter upper factories, 18; botanic medicine manufacturers, 7; bottle manufacturers, 2; bottlers, 64; box making factories, 3; box strap manufacturers, 2; brass founders, 17;

brass and copper plating works, 3; brass and iron bedstead factories, 1; brass goods manufacturers, 3; brass sign works, 3; brass and iron window guard maker, 1; brewers, including weiss beer, 34; brewery fixtures manufacturer, 1; brick manufacturers, 42; bricklayers, (employing) 161; bridge builders, (iron and steel,) 1; broom factories, 30; brush factories, 20; buckle factories, 2; buggy top manufacturer, 1; builders' iron work shops, 6; bustle manufacturers, 2; butchers, (beef,) 285; butchers, (pork,) 211; butchers, (mutton,) 82; button hole manufacturers, 14; button manufories, 3.

C.

Cabinet makers, 45; can factories, 25; canning house outfit manufacturers, 2; car manufactories, 1; car wheel works, 1; carpenters and builders, 690; carpet, chain and warp manufacturers, 2; carpet factories and weavers, 26; carriage and wagon builders, 93; cart builder, 1; carvers (wood) shops, 7; chair caning shops, 13; chair manufacturers, 6; chalk manufacturers, 1; chemical eggs manufactory, 1; chemical fire extinguisher and apparatus factory, 1; chemical factories, 23; chemists manufacturing, 33; chewing gum manufactories, 5; children's carriage factories, 3; china decorating works, 7; christmas tree ornament factories, 1; church furniture manufactories, 3; church organ factories, 6; eider manufactories, 6; cigar box factories, 11; cigar manufacturers, 367; cigarette factories, 3; clasp manufacturer, 1; clay pipe factories, 2; cloak manufacturers, 18; clothing factories, 65; coal miners and shippers, 46; coat pads, 1; coffee roasters, 10; coffin factory, 1; collar and cuff factories, 5; candy factories, 27; construction companies, 6; cooper shops, 55; copper works, 2; coppersmith shops, 9; corset makers, 7; cotton bat factory, 1; cotton mills, 11; cracker bakeries, 5; curled hair factories, 3; contractors, 111.

D.

Desk factories, 2; die makers, 3; disinfectant factories, 5; distillers, 18; drain pipe and tile factories, 3; drug box factory, 1; druggists' specialties manufacturers, 4; dyers and scourers, 85.

E.

Edge tool factory, 1; egg crate factory, 1; electric construction companies, 15; elevators, (grain,) 6; elevator manufacturers, 8; enameled ware, 2; engineers and machinists,

28; engravers and die sinkers, 26; engraver on glass, 1; engravers on wood, 22; express companies, 19; extract manufacturers, 6.

F.

Fancy box factories, 2; feather dyeing establishments, 4; fertilizer factories, 44; fire brick factories, 4; fireworks factory, 1; flooring manufactories, 3; flavoring extract factories, 7; folding box factories, 3; fruit box manufacturers, 1; fur manufacturers, 2; furnace manufactories, 7; furniture factories, 33.

G.

Galvanizers, 2; gas engine builders, 4; gas machine manufacturers, 2; gas meter factory, 1; gas saving machine manufacturers, 3; gilder's shops, 3; ginger ale factory, 1; glass factories, 9; glucose factory, 1; glue factory, 1; gold leaf factories, 2; gold pen factory, 1; granite works, 16; grate manufacturers, 1; grinders and polishers, 12; gunmakers, 7; gas company, 1.

H.

Hand organ builder, 1; hardware manufacturers, 4; hat and cap manufacturers, 18; hat tip printers, 4; hay and straw packers, 7; hide salters, 2; hominy mills, 2; horse collar manufacturers, 9; horseshoers, 37; hosiery factories, 7; hub and spoke factories, 3; husk factories, 4; hydrant manufacturer, 1.

I.

Ice box manufacturers, 3; ice cream manufacturers, 36; ice machine factories, 3; ice manufacturers, 5; insect fluid and powder manufactories, 4; iron foundries, 31; iron furnaces, (for making pig iron,) 1; iron phosphate manufacturer, 1.

J.

Japanners, 4; jewelry manufacturers, 14.

L.

Label and show cards, 3; lace and ruffling manufacturers, 3; ladies' underwear factory, 1; ladies' wrapper factory, 1; lamp black factory, 1; large laundries, 45; leather dressing manufacturers, 3; lime burners, 17; lithographers, 19; lumber manufacturers, 7.

M.

Machine tool manufactory, 1; machine shops, 60; malsters, 5; marble and granite works, 70; marine railways, 10; mattress and bedding manufacturers, 24; milk can manufacturers, 2; millwrights, 3; mineral water manufacturers, 16; model makers, 4; motor manufactory, (water,) 1.

N.

Neckwear manufacturers, 9; needle manufacturers, 2; netting and seine manufactories, 2; newspapers, daily, weekly, etc., 97; nickel platers, 5; night robe manufacturer, 1.

O.

Oakum manufactory, 1; oil clothing manufacturers, 2; oil manufactories, 22; oil refineries, 5; oil-stove manufacturer, 1; organ builders (church and family), 10; over-gaiter manufactory, 1; overall manufacturers, 8; oxola shortening manufacturer, 1; oyster and fruit packers, 116.

P.

Packing-box manufacturers, 16; paint manufacturers, 15; painters (employers), 479; pants manufacturers, 28; pants clasps, 1; paper-bag factories, 5; paper-box factories, 19; paper manufacturers, 5; paper rulers, 4; paste manufactories, 2; patent medicine proprietors, 71; pavers, graders and contractors, 12; pharmacists manufacturing, 4; photo-engravers, 4; photographers, 58; piano manufactories, 5; pickle and sauce manufacturers, 41; pipe manufactory (wood), 1; planing mills, 14; plasterers (employers), 82; plastic slate roofing manufactory, 1; plumbers (employers), 297; potteries, 10; preserving manufactories, 13; printers (book and job), 145; printers' roller factories, 5; provision packers, 22; "puddine" factory, 1; pump manufacturers, 10.

Q.

Quarries, 17.

R.

Railroad brakes and switch factories, 2; railroads (steam), 16; railroads (electric), 16; refrigerator factories, 7; regalia manufacturers, 2; riggers, 3; rolling mills, 2; roofers and

spouters (metallic), 22; roofers (gravel, asphalt, etc.), 5; roofers (slate), 5; roofers (tile), 4; roofing tile factories, 5; rope-makers, 5; rubber stamp factories, 7; rustic work factories, 2.

S.

Saddle and harness makers, 126; safe manufactories, 2; sailmakers, 24; salve manufacturers, 2; Saratoga chips manufacturer, 1; sash weight foundries, 3; sausage manufacturers, 47; sausage casings factory, 1; sawmakers, 3; saw mills, 3; scroll sawing, turning, etc., factories, 2; seal engraver, 1; ship-joiner shops, 7; shipsmith shops, 10; shirt manufacturers, 39; shirt waist factories, 12; shot manufacturers, 2; show case manufacturers, 4; sign manufacturers, 3; silver leaf factories, 2; silver plated ware factories, 10; silversmiths (manufacturing), 6; silverware cases, 1; slipper manufacturers, 7; snuff manufacturers, 2; soap manufacturers, 9; soda water apparatus, 3; solder factories, 4; spice mill, 1; spring bed factories, 2; stained glass factories, 2; staves and heading factories, 2; statuary, plaster of Paris, 2; steel casting foundries, 2; steel manufacturer, 1; stencil manufacturers, 5; stevedores, 9; stove polish factories, 2; straw goods manufacturers, 6; stove manufacturers, 13; sugar refineries, 1; suspender manufacturers, 6.

T.

Table manufacturers, 2; tack and nail factories, 2; tag manufacturers, 1; tanners and curriers, 15; telegraph and telephone companies, 8, terra cotta manufacturers, 4; thermometer maker, 1; tin and sheet iron workers, 190; tin plate manufacturers, 2; tin strip and circle factories, 2; tinware manufacturers, 12; tobacco manufacturers, 8; tool manufacturers, 7; toy manufacturers, 2; truck manufacturers, 4; trunk manufacturers, 8; tailors (employing), 578.

U.

Umbrella factories, 4; upper manufacturers, 1.

V.

Veneer manufacturer, 1; velocipede factory, 1; vinegar manufacturers, 8; violin factory, 1.

W.

Wagon manufacturers, 74; washing powder manufacturer, 1; watch case manufacturer, 1; wharf builders, 2; wheel

manufacturers, 2; wheelwrights, 13; whip factories, 2; white lead factories, 2; wood (sawed and split) mills, 9; wood-filler manufacturer, 1; woollen goods factories, 5; wire work factories, 5.

Y.

Yeast factories, 13.

The above list shows that in the city of Baltimore there are 5,141 factories and workshops of all kinds, extensive works and those of smaller pretensions. Contractors, builders and other employers in the list, not actually manufacturers, are, of course, not included in this total, the figures given (5,141) relating only to *bona fide* manufacturers, large or small.

The capital invested in these numerous enterprises is estimated at \$120,000,000; annual production, \$175,000,000; number of hands employed, 100,000, and aggregate wages per annum, \$42,000,000.

Following this is a similar classified list of the industries of the State in the various counties, from Allegany to Worcester:

COUNTY INDUSTRIES.

A.

Acid factory, 1.

B.

Bakeries, 114; basket manufacturers, 24; bending mills, 1; bicycle factories, 1; blacksmiths, 898; blank book manufacturers, 1; blue manufacturer, 1; boat builders, 23; boiler-maker, 1; bone mill, 1; book-binderies, 4; boot and shoe manufactories, 2; bottlers, 36; box factories, 4; brewers, 4; bricklayers (contractors) 25; bridge builders, 3; broom factories, 18; brush factory, 1; butchers, 253.

C.

Cabinetmakers, 29; can factories, 8; car manufacturers, 1; carpenters and builders, 1,361; carpet manufacturers, 3; carpet weavers, 15; Carriagemakers, 146; carriage trimmers, 4; cement manufacturers, 7; chair factories, 5; chemists, (manufacturing,) 2; churn manufacturer, 1; church organ factory, 1; cigar box factories, 3; cigar manufacturers, 160; cloak factory, 1; coal miners and shippers, 25; coffin factory, 1; confectioners, (manufacturing,) 2; contractors, 78; cooper shops, 45; cotton mills, 15; crab packers, 14; crate manufacturers, 4.

D.

Dairies and creameries, 201; Distilleries, 25; dye works, 4.

E.

Electric light companies, 20; elevators, (grain,) 8; engine builders, 2; engraving establishment, (glass,) 1.

F.

Feed mills, 11; fertilizer factories, 16; fire brick manufactories, 8; flint mills, 10; flour and grist mills, 737; fruit and vegetable packers, 259; fruit evaporators, 2; furniture manufactories, 7.

G.

Gas works, 8; gate factories, 1; glass etching and staining works, 1; glove manufacturers, 5; glue works, 1; granite quarries, 15; gunmakers, 11.

H.

Hat and cap manufacturers, 1; hay pressers, 29; hominy mills, 7; horseshoers, 32; hosiery factories, 5.

I.

Ice manufacturers, 10; ink factory, 1; iron founders and machinists, 27; iron furnaces, 4.

L.

Ladder manufacturer, 1; ladies' underwear factory, 1; large laundries, 15; lime burners, 38; locksmiths, 2; lumber manufacturers, 21.

M.

Machinists, 68; marble and granite works, 49; marine railways, 13; mattresses and bed manufactories, 5; millwrights, 16.

N.

Newspapers, (daily,) 7; newspapers, (weekly,) 129; nurserymen, 36.

O.

Oil manufacturers, 2; oyster packers, 89; oyster dredge manufactories, 1.

P.

Packing box factories, 5; paint works, 1; painters, 267; paper bag factory, 1; paper box factory, 1; paper mills, 36; pattern makers, 1; peach basket factory, 1; photographers, 38; planing mills, 27; plasterers, 87; plumbers and steam fitters, 48; potteries, 6; printers, (book and job,) 146; pulp manufacturers, 3.

Q.

Quarries, (slate,) 6.

R.

Rat trap factory, 1; razor strap factory, 1; roofers, (metallic, tile, etc.), 4; Ropewalks, 2.

S.

Saddle and harnessmakers, 150; sailmakers, 13; sash, door and blind factories, 5; saw mills, 389; sheet iron manufactories, 2; shingle manufactories, 9; shirt factories, 14; sign manufacturers, 1; silicate works, 2; soap works, 3; spoke and hub works, 4; spring bed factory, 1; stave factories, 4; steel works, 3; stonecutters, 7; stonemasons, 246; stove foundries, 8; straw board factory, 1; straw goods manufacturer, 1.

T.

Table manufacturers, 2; tailors, 110; tar manufactory, 1; tanneries, 22; telegraph and telephone bracket manufactories, 1; telephone companies, 8; tile factories, 3; tin and sheet iron workers, 113; tin plate factory, 1; tong and shaft manufacturer, 1; tool manufacturer, 1.

V.

Veneer manufacturer, 1; vinegar factory, 1.

W.

Wagon builders, 177; washing machine factory, 1; water companies, 15; wharf builders, 1; wheel manufacturers, 2;

wheelwrights, 182; whip factories, 1; windmill factories, 2; wire fence manufacturers, 4; woolen goods mills, 13.

It will be seen by the above that in the State, outside of the city of Baltimore, there are 5,016 *bona fide* manufacturing establishments, which speak volumes for the industries of the State and the enterprise of her citizens; as will be seen, the 737 flour mills, 239 fruit packers, 389 saw mills, 136 newspapers, 89 oyster packers, 898 blacksmiths, 146 carriage and wagon builders, and 201 dairies and creameries, largely swell the list.

FARMING.

Following is a table showing the number of farmers in the various counties of the State:

COUNTIES.	Area in Sq. Miles.	No. of Farmers.
Allegany.....	477	890
Anne Arundel	400	1,433
Baltimore.....	622	3,760
Calvert.....	218	904
Caroline.....	315	1,213
Carroll.....	426	2,395
Cecil.....	375	1,375
Charles	460	1,006
Dorchester	610	1,229
Frederick.....	633	2,599
Garrett	680	920
Harford.....	422	2,060
Howard.....	250	1,049
Kent.....	315	755
Montgomery	508	1,094
Prince George's.....	480	1,386
Queen Anne's.....	352	843
St. Mary's.....	360	1,018
Somerset	365	1,007
Talbot.....	285	857
Washington.....	435	1,830
Wicomico	369	1,258
Worcester.....	475	865
Total.....	9,382	32,556

CHAPTER VIII.

WAGES AND HOURS OF LABOR IN BALTIMORE TRADES.

This chapter contains a brief summary of the wages and hours of labor of the workmen engaged in the trades herein mentioned. Also, the present state of the trade is given whenever obtainable. The building trades were published in the last report, and there was but little change in their status during 1897.

Bakers.

Workmen in this branch of trade are paid as follows per week: First hands, \$9 and board; second hands, \$8 and board; third hands, \$5 and board. These figures are considered equivalent to \$12, \$11 and \$8 per week. Ten hours is considered a day's work. Bakers as a rule make full time.

Barbers.

Wages range from \$8 to \$12 per week, or equivalent in board, many of the hands boarding with their employers. Hours from 7 A. M. to 9 P. M. daily and to 12 o'clock midnight on Saturdays. Barbers are allowed a half day off weekly, with pay.

Boiler Makers.

Boiler makers are paid from \$2 to \$2.75 per day of nine and one-half hours. Business is reported as much improved as compared with 1896, and hands as a rule are making full time.

Brick Makers.

Brick makers make from \$8 to \$10 weekly, a day's work being ten hours. Workmen average about nine months' employment during the year. At present this industry is dull, showing but little improvement over 1896.

Blacksmiths.

Wages in this trade vary from \$2.50 to \$3.50 per day, according to the class of work. Ten hours comprise a day's

work. Business shows a considerable improvement as compared with 1896.

Box Makers.

Those in this trade work by the piece, and their wages average from \$6 to \$12 per week. Ten hours constitute a day's work. A considerable improvement is reported in this business as compared with the previous year. The men average nearly full time.

Brush Makers.

The wages in this trade are from \$1.50 to \$2 per day, of eight hours. Business remains quiet, and workmen average about eight months in the year.

Bookbinders.

Bookbinders are paid from \$13.50 to \$18 per week, according to the class of work and the skill of the workmen. Hands work ten hours daily and nine on Saturday. Trade is reported as improving, and nearly all hands make full time.

Brass Moulders.

Those working at this trade earn from \$2 to \$2.50 per day, of ten hours. Business has improved a little as compared with 1896.

Basket Makers.

These workmen are paid by the piece, and the average wages earned are from \$10 to \$15 per week, a day's work being ten hours. Workmen make full time, although this trade is considerably injured by foreign competition.

Brass Finishers.

Men in this industry are now working ten hours per day, and a half day only on Saturday. They do piece work, and their wages are from \$12 to \$18 per week, according to skill and the class of work. Employers complain that while business is better than in 1896, profits are less owing to close competition.

Broom Makers.

Broom makers work by the piece and average from \$7 to \$9 per week, a day's work being ten hours. Workmen average ten months employment, annually. This trade is reported as dull.

Butchers.

Beef butchers average about \$12 per week, and mutton butchers the same. Pork butchers range from \$9 to \$15. Beef butchers who do the dressing are paid from 35 cents to 40 cents per head, and at the abattoirs and large establishments make better wages.

Canmakers.

Wages in this branch of trade, once among the best, vary with the several busy seasons, and wages average from \$8 to \$12 per week. Ten hours being a day's work, and the men average about nine months work in a year.

Candy Makers.

In this branch of the trades, journeymen earn from \$12 to \$15 per week, according to the class of work. Boys and girls, of whom many are employed in the factories, are paid from \$3.50 to \$4 per week. Workmen average eight months employment.

Cotton Mills.

In these establishments there is much child labor (viz., over fourteen years of age), and the pay for such, runs from \$2 to \$6 per week. The section men are paid as high as \$3.25 per day, of ten hours work. This industry is quoted as being very dull at present, owing to the depression in raw material. The lower wages and longer hours worked in the mills in the cotton States greatly injure this industry in Maryland. Operatives, however, as a rule are making full time.

Coopers.

Flour barrel coopers do piece work, and are paid 10 cents per barrel. They average \$2 per day of nine hours, and have steady employment for about nine months in the year. Coopers who make wine, whiskey, lard, oil, vinegar and other tight barrels, are paid from \$2.50 to \$3 per day, of ten hours. Business shows a slight improvement, and the men are making better time.

Carriage Makers.

Under this head wagon makers are included. Their wages are from \$2 to \$2.50 per day of ten hours. Business is reported as fair, and the men are making full time.

Cigar Makers.

In this industry wages range from \$6 to \$18 per thousand. At these figures workmen average from \$10 to \$15 per week. Nine hours constitutes a day's work. This trade, during the latter part of 1897 greatly improved, and at several of the factories night work had to be resorted to, to keep up with the orders. The output of the large factories in Baltimore is mostly shipped away from the city.

Cabinet Makers.

Furniture workers are also classed under this head. Too much immigration and the strong competition of western factories, combine to keep down wages. They work by the piece, and wages run from \$7 to \$12 per week. Ten hours is a day's work. The men average about ten months in the year.

Conductors.

Street cars, \$1.75 per day of twelve hours.

Coppersmiths.

Workmen in this trade are paid \$3 per day of ten hours. Business is quoted as improving and workmen have steady employment.

Carvers.

There are thirty carvers in the city and their wages, according to skill, average from \$12 to \$15 per week. There are two or three fine workmen in the city, who are paid as high as \$4.50 per day. Machine work has greatly injured this business, and carvers only average about nine months in the year. Nine hours constitute a day's work.

Cutlers.

Cutlers and grinders work ten hours per day and receive an average of \$2.25 per day in wages. They have constant employment all the year round. Business in this line is represented to be greatly improved, an increase of at least 33½ per cent. being reported as compared with 1896.

Electrotypers.

Business in this trade is reported as being good and workmen are paid \$3 per day for ten hours' work. The men make full time.

Engravers.

Wood engravers work by the piece and their wages range from \$8 to \$18 per week, accordingly. Eight hours is a day's work and hands make about two-thirds time annually. This industry has been almost entirely superseded by photo-engraving. Photo-engravers have steady employment and their wages run from \$15 to \$20 per week.

Hatters.

Work in this branch of industry is by the piece and the workmen are paid from \$10 to \$15 per week. Business is reported as much better than in 1896.

Hubs and Spokes.

Workmen in this trade make from \$10 to \$15 per week, ten hours constituting a day's work. Trade is not very brisk, but workmen have made full time during the year.

Harness Makers.

Harness makers work by the piece, ten hours daily. Their pay ranges from \$10 to \$14 per week, with constant employment.

Hod Carriers.

The strike of this body of workmen in the early spring of 1897 proved unsuccessful, and they are working for the same pay as heretofore, viz: from \$2 to \$2.50 for a day's work of nine hours. These men hardly average seven months in the year and are mostly colored. In the dull season they engage in oyster shucking and other vocations.

Horseshoers.

Floor hands receive \$2 per day, fire hands \$2.50 per day of ten hours. Business is reported as fair and the hands are making full time.

Iron Moulders.

Wages in this branch of industry vary according to the different classes of work in which the men are engaged. Their per diem is as follows: \$1.50, \$1.75, \$2, \$2.25 and \$2.50. In some of the more skilled branches they receive as high as \$3 per day. Their hours of work vary in different shops, and they have made better time than in 1896.

Jewelers.

A day's work in this trade consists of ten hours, and workmen have constant employment. Their wages range from \$12 to \$15 per week. Employers report business as showing signs of improvement.

Machinists.

Machinists receive from \$2.50 to \$2.75 per day, of ten hours. Business in this branch has revived somewhat, and the men are making better time.

Musicians.

(Band) musicians are paid from \$2 to \$7 per man, according to the time occupied and the nature of the services rendered. For regular engagements at the theatres and other resorts the pay is \$15 per week, the leader to receive not less than \$25.

Motormen.

(Street cars,) \$1.75 per day of twelve hours.

Meter Makers.

Men in this branch of trade receive from \$12 to \$16 per week. Ten hours constitutes a day's work, with constant employment.

Oyster Shuckers.

Workmen are paid by the gallon and wages range from \$6 to \$12 per week, according to the skill of the shucker. The busy season lasts about six months.

Organ Makers.

In this trade wages range from \$2.50 to \$3 per day of ten hours, with constant work. The business is reported as fair.

Pattern Makers.

Wages range from \$2.25 to \$3 per day, according to the class of work and the skill of the operator. Some of the shops work nine hours and others ten hours. The men have constant employment. No material change is to be noted in the business as compared with 1896.

Plumbers.

Wages range from \$2 to \$2.50 per day, nine hours constituting a day's work. Plumbers make about nine months in the year.

Painters.

The wages of painters are as follows: \$2, \$2.25 and \$2.50, according to the nature of the work. Eight hours comprise a day's work. Painters average about nine months' steady work per year.

Paper Hangers.

Nine hours constitute a day's work for paper hangers and their pay is \$12 per week. They average about eight months work in a year.

Pavers.

Cobble-stone pavers get \$3 per day, of nine hours, and block pavers get \$4.50 per day, of nine hours. These workmen lose a large portion of the year through inclement and cold weather. Business for 1897 is reported as having been fairly good.

Piano Makers.

Several grades of workmen are engaged in this industry, and the wages vary accordingly. Varnishers earn from \$7 to \$12 per week; finishers from \$15 to \$20 per week; cabinet makers from \$8 to \$18 per week. Ten hours constitute a day's work. Business shows a slight improvement, although the men as a rule are only making three-quarter time.

Silver Platers.

Wages in this branch of trade range from \$15 to \$18 per week, ten hours being considered a days work. The state of this trade is about the same as in 1896, with perhaps a slight improvement. Workmen make full time.

Ship Carpenters.

Receive \$2.75 per day, of ten hours.

Ship Joiners.

Receive \$2.75 per day, of ten hours.

Ship Caulkers.

Receive \$2.50 per day of ten hours.

Ship Painters.

Receive \$2.50 per day of ten hours.

Ship Yard Laborers.

Receive \$1.50 per day of ten hours.

Ship Scrapers.

Receive \$2.25 per day of ten hours.

Shipsmiths.

Receive \$2.50 per day of ten hours. During the year 1897 business has been quite brisk at the various ship yards, and the workmen have not lost much time, except from inclement weather.

Tinners.

Workmen in this trade are paid from \$1.50 to \$2.50 per day, according to the class of work done. Ten hours constitute a day's work. Machinery has done much to injure this once prosperous trade, and tinners do not average more than eight months' work in the year.

Tanners.

Tanners work by the piece, and nine hours a day. Their wages range from \$7.50 to \$11 per week, with steady employment. Employers say that the recently passed tariff law, which abolished the free import of hides has injured business, and it is consequently depressed.

Type Founders.

These are paid \$2.50 per day for ten hours work. The newly invented printing machines have greatly injured this branch of industry, and the workmen now only average about nine months' employment in a year.

Tailors.

(Merchant tailor employes.) Wages are, on an average, \$12 per week. Ten hours comprise a day's work, and the men have constant employment. Business is reported as having improved.

Tobacco Workers.

Workers in the various tobacco factories, including cigarettes, smoking tobacco, etc., include many girls over fourteen years of age. Wages are as follows: Between fourteen and sixteen years, the average weekly wages earned is \$4; over twenty years, the average earned by the girls is \$6 per week. The male employes (adults) average \$8.50 per week. A day's work is ten hours, and the employes have constant employment.

Watchmakers.

The day's work in this trade is ten hours, and the workmen earn from \$12 to \$18 per week, full time being generally made.

CHAPTER IX.

OYSTER CULTURE.

The oyster industry of Maryland is one of the greatest sources of wealth to the State and her citizens, and anything that affects it is of the deepest interest to the people. The Chesapeake bay, which is the largest and most prolific in oysters, fish and water fowl in the United States, has a water surface of 2,300 square miles, and the oyster beds lie at intervals along either side of the channel in, as a rule, water less than forty feet in depth. The total area occupied by oyster beds in the bay is estimated at about 200 square miles. Notwithstanding this large acreage, the supply is becoming less, the result of promiscuous and persistent fishing. This state of affairs necessitates a thorough consideration of the question and the devising of some method for the better protection of the natural beds, and the adoption of some mode of largely increasing the supply. Anything bearing upon this subject is of vital moment to our people, and, as pertinent to the matter, extracts are given below from an article on "Oysters" by H. F. Moore, Assistant United States Fish Commissioner, which appeared in Commission's report for the year 1897.

The article is designed to briefly set forth the principal facts relating to the subject of oyster-culture in the United States. It embraces the practices of proved commercial value as well as a summary of the methods and results of investigations which appear to give promise of utility in certain places and under special conditions, or which indicate the lines along which profitable experiment may be carried on. It is intended primarily as a guide to those persons who are exhibiting an interest in the subject and who contemplate embarking in the industry, yet, hesitate on account of unfamiliarity with the methods employed.

THE OYSTER.

Destruction of Natural Beds, Causes and Remedies.

Until a comparatively recent date, our supply of oysters was drawn almost entirely from the natural beds, which were

originally so vast, that it was a common saying that they were inexhaustible. The fallacy of this view has been abundantly proven, and wherever reliance has been placed upon natural beds solely, there has been a decreasing supply to meet an increasing demand. Many causes have been cited to account for the decrease in the productiveness of the oyster beds, but, wherever unprejudiced investigation has been brought to bear upon the subject, the verdict has always been that the fishing upon the beds has outgrown their fecundity.

Vast as is the production of spawn, the chances against its growth to maturity, are such as to limit the productiveness of the beds. Much of it fails of fertilization. Most of which passes that critical stage becomes a prey to enemies or falls upon unsuitable bottom, where it fails of attachment and sinks in the ooze. Even after the vicissitudes of larval life are passed the infantile "spat" may be buried in an accumulation of organic or inorganic sediment, or it may be devoured by enemies against which it can present no adequate defense. Storms may tear the adult oysters from their attachment and cast them upon the shore, or they may become covered by sand and seaweeds drifted in by the waves; or, again, excessively cold weather may cause their death in exposed places by freezing.

Numerous as are the perils which beset them under their natural surroundings, they have, upon the whole, found the conditions favorable for their maintenance and increase until civilized man began his systematic attacks. It is true, that before the appearance of the white man upon the scene, they had disappeared from regions where they were formerly found, but upon our coasts such instances are isolated and rare.

Without going into the evidence, it may be asserted as a demonstrated fact, that overfishing is the cause of the depletion of our oyster beds, and that it produces its damaging effect in several ways:

1. It removes the adult oysters, which are either spawning or capable of spawning, and thereby reduces the reproductive power of the bed as a whole.

2. It removes the shells, and therefore, decreases the available points of attachment for the spawn. When the oysters are not culled on the beds this effect is aggravated by the removal of the dead shells.

3. Spat and young oysters attached to the shells of adult oysters are removed from the beds, and as it is impracticable in many cases to detach them, they are of necessity destroyed.

4. The quantity of oysters taken and destroyed from the several causes mentioned is greater than that which is annually permitted to grow up in their places.

Many causes have been assigned as tending to deplete the oyster beds, and many remedies have been proposed. Various phases of the oyster business have been cited to show cause why they should not be curtailed or abolished as destructive. It has been proposed to restrict the demand by prohibiting canning; to prohibit the use of this or that kind of apparatus, or to interfere in various ways, with more or less legitimate methods of meeting and increasing the demand.

The attempts that have been made to keep the demand upon the beds within the limits of their fecundity have so far been failures, and such attempts are also seen to be illogical when it can be shown that the reciprocal measure, increasing the supply is perfectly feasible.

The dictates of sound economics require that no effort be made to restrict the demand until it can be shown that efforts to increase the supply are futile. A growing demand for a product is the most trustworthy indication of an industry's prosperity, and the only rational manner in which to bring the supply and the demand into equilibrium is to increase the former. Only after all efforts to save the supply from total extinction, should a restriction be placed upon the demand.

The close season has been a favorite measure in protective legislation, as it has been in most legislation, looking to the perpetuation of game and fish. It is usual to fix the close season during the spawning months, upon the theory that the reproductive act should be allowed to proceed unmolested. It really matters little whether the oyster is taken during the spawning season or a month or two before; the effect upon the fishery is the same, as in either case the bed is deprived of an individual capable of reproducing its kind. The only effect of a close season, whenever occurring, is to reduce the time during which the oyster is subject to attack from the oystermen.

Even this is of little avail with the sedentary oyster, for it is possible for 365 men fishing ten days, to effectually "clean up" a bed as can be done by ten men fishing throughout the year. This has been found to be the practical result of a

close season in some places; the first few days of fishing removing so many of the oysters as to make it unprofitable to work the beds the rest of the year.

The methods by which the increased demand resulting from a widening of the markets may be met, will be treated of in another connection. It may be necessary in some parts of this country, as in Europe, to reserve the natural beds for the production of seed. Such a reservation would naturally excite the strenuous opposition of the oystermen; but should the industry ever be reduced to the desperate condition at one time found in France, correspondingly desperate remedies must be invoked.

INCREASE OF SUPPLY BY ARTIFICIAL MEANS.

In many countries in which oysters are an important article of food, it has been found necessary to give nature some assistance in order to maintain or increase the supply of oysters available for the markets. The direction in which this assistance is rendered is governed by local conditions, but in general it may be stated that all methods of oyster culture depend for their success upon the modification of the natural conditions in such a manner as to bring about one or several of the following results:

1. An increase in the number of eggs successfully fertilized.

2. An increase in the surface available for fixation, and consequently an increase in the amount of spat, which becomes fixed and passes through the early stages of spat existence.

3. The utilization and salvage of spat, which would otherwise fall victims to the several vicissitudes of their careers, storms, frosts, crowding, etc.

4. A decrease in the liability to attacks from enemies.

5. The utilization of otherwise neglected bottoms and food supplies.

Upon our coasts the objects above set forth, or some of them have been best realized by the process of "planting." This consists in placing firm bodies in the water for the purpose of catching the spat or in spreading young oysters upon the bottom in places suitable for their growth. Vast as are our oyster fields, but a small portion available for the growth of this mollusk has been utilized by nature. This has arisen from the fact that in many cases where the other conditions are favorable, the bottom is of such a character as to prevent the attachment of the young, though perfectly

adapted to the rapid growth of the adults. If then the "spat" be caught on planted "cultch," or partially grown oysters be placed upon such bottoms, the difficulty is overcome and nature has been assisted to the degree necessary, and all or some of the conditions mentioned above are more or less completely fulfilled; the first by increasing the number of adult oysters in any region, by their closer aggregation; the second, by the process of preparing the ground and sowing the shells; the third, by the use of seed from regions less favorable to its maturing; the fourth, from the greater care with which a bed under private ownership will be watched and guarded; and the fifth, by the very act of planting upon virgin or depleted bottom.

There are indications, however, that in certain portions of our oyster belt it may be necessary to follow some method of pond culture, not so much for the purpose of growing the oysters, but to fatten them for market. Should the possibility of this be demonstrated, under the conditions prevailing in the United States, a vast increase could be made to our oyster supply, as it is a well known fact that certain large areas are capable of raising oysters which they rarely fatten, and for which, therefore, no market can be found.

By some modification of pound culture, it may also be possible to raise seed oysters in regions in which few or none are now produced, thus adding another considerable item to the wealth-giving powers of our coasts.

PLANTING WITH SEED.

Preliminary to planting, the first essential is to determine whether private rights in oyster bottoms are recognized by law or countenanced by public opinion. Having determined that his rights in his riparian property may be successfully maintained, the next step is to select beds that present the proper conditions of temperature, density, bottom, food, etc.

Temperature—If it is desired to establish a self-perpetuating bed, the temperature should rise, for a considerable time during the spawning period, to between 68 and 80 degrees. If it be desired to merely increase the size of the seed oysters obtained elsewhere, it is not necessary for the temperature to ever rise so high, although, as a rule, warm waters induce more rapid growth.

Density—The density should be above 1.007 at least, and the beds should be so located as not to be subject to the influence of freshets, which would reduce the density below that

degree for any length of time. A density of over 1.023 is not advisable, although oysters may grow in places of a somewhat greater salinity.

Bottom—The character of the bottom is the most important consideration, and it is probable that, upon our coasts, the other conditions will be fairly met in any locality where suitable bottom is available. The selection should be made with care, and the methods employed should be adapted to the character of the ground. Otherwise the planter may be put to labor and expense without return.

Hard, rocky bottom is in general unsuited for the cultivation of the oyster. Such ground, while affording facilities for the fixation of the spat, does not furnish sufficient food to cause a rapid growth, such as is desired by the planter, unless there is an abundance of muddy bottom in the vicinity. Heavy clay is open to the same objection. Loose sand is liable to drift and bury the oysters, and deep, soft mud is absolutely fatal, as it allows even adult oysters to sink to such a depth that they are smothered. The best bottom consists of a firm substratum, above which is a layer of soft flocculent mud.

Food—The question of food is an indispensable one in oyster culture. Without a supply of suitable and proper food, it is useless to attempt the growth of oysters. As a general rule, it will be found that where the proper conditions of temperature obtain the vicinity of a muddy bottom, will be well stocked with the minute organisms upon which the oyster feeds; reliance upon this fact, however, is placing dependence upon a "rule of thumb," never a profitable method, where more accurate and scientific information can be obtained. Oystermen usually determine the best growing and fattening grounds by actual experiment, a proceeding often entailing the wasteful expenditure of time and capital, and the small cost which would be involved in making a preliminary biological survey would be, in most cases, well expended. The currents may be such as to carry the food organisms away, or for other reasons, beds apparently well situated, may be lacking in food, a fact not usually discovered until time and money have been wasted in experimental planting.

Making bed, etc.—The boundaries of the planting grounds should be marked with stakes in such a way that each planter will have no difficulty in distinguishing his own ground from that of his neighbor. In order to recover the boundary,

should the stakes be carried away in storms or by ice, it is usual to have ranges locating the most important marks, such as those at the corners of the beds, these ranges being either conspicuous natural objects, buildings, etc., or, preferably, signals erected especially for the purpose. In deep water, or upon bottoms where stakes can not be driven or held, buoys are commonly used for locating the beds.

Having located and marked the beds, the ground should be prepared for planting, and if it is necessary to build stockades to protect the oysters from fish, this should also be done before planting is begun, as otherwise the bed may be ruined before it is fairly planted. The clearing up of the grounds is usually done by means of the dredge, all debris being carefully removed. This work is performed best by steam, the work by sail vessels being more laborious and less rapid.

If the bottom is firm, or there is a firm sub-stratum an inch or two below the soft surface layer, no further preparation is needed. When there is a soft mud of some depth, however, it is absolutely necessary that the surface be prepared in some way, which will prevent the oysters being completely submerged and suffocated in the soft mud. This is usually done by distributing over the soft places various hard substances, which resting upon the mud, give it a firm surface upon which the oysters repose in safety. In France where the lack of suitable grounds frequently requires the use of very soft bottoms, this difficulty is sometimes overcome by the expensive means of macadamizing the bottom with gravel and clay. While this course, forms an excellent bottom, hard and smooth, it can only be used on grounds exposed at low tide.

American planters usually provide a firm surface by strewing oyster shells, clam shells, gravel or sand over the bottom in such quantities as to have the desired effect. When shells or gravel are used the double purpose is often served of preventing the submergence of the adult oyster in the mud, and offering a place of attachment for the spat. In some places sandy and gravelly material, resulting from dredging for harbor improvements, has been utilized for this purpose, and much softer bottom, before valueless, has been made to yield a profitable return to the planter. Such material can often be obtained at a very small cost, sometimes merely for the cost of transportation to the beds.

In surfacing, care should be exercised that the firm layer be deposited uniformly, as otherwise the muddy bottom will

be exposed in places, and the oysters falling thereon in planting will be engulfed in the mud. Plenty of material should always be used, as it is poor economy to spend money for work and material which is insufficient to accomplish the end sought. The exact amount necessary will depend upon the character of the bottom. Where it consists of a very deep, pulpy or flocculent deposit, it is useless in most cases to attempt to improve it, as the surface material will sink almost as fast as it is deposited. When the bottom is properly surfaced with coarse sand or gravel, it does not, as a rule, require another coat for four or five years. When there is a rapid deposit of mud it will, of course, soon become covered up, but a location where this takes place with much rapidity should perhaps be left alone, as the seed oysters are liable to suffocation by the deposit of material upon them. A strong current will prevent this deposit and keep the surface scoured after it has once been prepared.

After the ground has been thoroughly prepared, according to its requirements, the next consideration is the actual planting of the oysters. Planters follow one of two methods, as their interests and experience may dictate; they either plant seed oysters and raise them to an adult or marketable size, or they use cultch to catch the spat, which may be either sold as seed or retained until it has grown. The former method is perhaps the simpler and more uniformly successful in most localities, and, it will be, therefore, the first discussed.

Seed oysters are young or immature oysters, suitable for planting. They vary in size from minute "blisters" up to the well grown oysters, which will be ready for market in six months after they have been bedded. In most cases they run in size between 1 and $1\frac{1}{2}$ inches, or from about the size of a silver quarter up to the size of a silver dollar..

Some planters collect seed for themselves, but most of them prefer to buy from those who make a specialty of that branch of industry. The larger growth of seed brings a better price than the smaller, as it takes a shorter time to bring it to maturity and it is less susceptible to the attacks of enemies. Seed, just as it comes from the beds, contains much besides oysters; sometimes as much as 75 per cent., consisting of old shells, sponge and other rubbish. Though such material may be obtained at a low price, it is not generally regarded as economical, as a larger quantity must be planted than when good seed is used, the bed is littered with undesirable rubbish of all kinds, and is liable to become stocked with

enemies which will cause trouble in the future. The uncultured seed is liable, also, to grow into rough oysters, crowded with bunches of undesirable shapes, which bring a smaller price when put upon the market.

When culled stock is selected—that is, seed consisting of separate individuals of good shape and uniform size—it is said to generally give satisfactory results. It is free from rubbish and enemies, and, being vigorous, is able to at once avail itself of such advantages as the beds possess, and its growth is correspondingly rapid. The oysters being separate from the beginning, when they reach maturity they are shapely and in good condition.

It has sometimes happened that good results have followed the sowing of spat covered with shells, purchased from the canneries, but this method is precarious, unless the shells are used in the process of spat-collecting as described hereafter.

The locality whence the seed is derived is also important. Oysters taken from a warm region, where food is plenty and growth is rapid, to a colder region, where food is more scanty, are, it is stated, not always successfully acclimated, unless the transfer is made when the oyster is very young. The planting of Southern seed oysters was formerly an important industry in Long Island Sound, but it has been almost entirely supplanted by shell culture. Each spring a comparatively small number of Chesapeake oysters are set down, as they have been found to fatten earlier in the fall than the native stock. There is no complaint of excessive mortality in the Virginia plants, and it is claimed that they spawn freely in summer even if bedded in the preceding spring.

The seed oysters are usually scattered over the beds from boats or scows. Care should be exercised to get them as equally distributed as possible, as experience has shown this to be advantageous to their growth. When thrown into heaps many are prevented from getting a proper supply of food, and the crowding may also cause irregularities in the shape of the shells, thus reducing their market value.

In order to secure a proper distribution over a bed, it may be roughly marked out into areas, say 50 feet square, in each of which an equal amount of seed should be planted by scattering it broadcast with shovels or scoops from the boat or the scow. In dividing the bed a few rough stakes or buoys may be used as temporary guides.

Another method is to anchor the boat upon the bed, distribute the required amount of seed over the area which can

be reached by throwing the oysters from a shovel, and then move on to the next station, where the boat is again anchored and the operation repeated. When the scow is emptied a buoy or stake may be used to mark the spot of the last deposit, and operations can be resumed from that point with the next boat load. By such means the seed is rapidly and evenly spread over the bottom.

It is not well to deposit the oysters very thickly. From 300 to 600 bushels per acre appears to be the usual amount in most places. The ground will, of course, support a larger number of yearling seed, but as they grow larger there will be more or less crowding, and the demand for food will be greater.

In certain places, where oyster planting has greatly increased within recent years, it is found that the oyster neither grows as rapidly nor fattens as readily as formerly, and it is supposed by many that the quantity of oysters has outgrown the ability of the region to supply them with food. The matter has not yet been investigated and the facts in the case are not definitely known, but the theory proposed is a plausible one, to account for the difficulty with which the planter is beset in fitting his stock for market. It is well known that when the seed is sowed too closely upon a given bed, the oysters grow and fatten more slowly than upon less thickly populated ground, and only in waters exceptionally rich in food can the quantity of seed planted exceed with safety the number of bushels stated. When the seed is sowed too thickly, there is also a tendency to distortion from crowding.

When seed oysters of good quality are used it is generally not regarded as necessary to "work the beds," although care should be taken to prevent, if possible, the inroads of enemies. The various methods of attempted protection from various enemies have been frequently discussed.

It is sometimes advantageous to dredge over the planted beds to remove debris, seaweeds, etc., which have drifted upon them, and which of itself and by the collection of sand, etc., would smother the oysters if allowed to remain. If the bottom is not perfectly fixed it may be necessary to shift the oysters during their growth, in order to prevent "sanding," that is, being covered with sand, etc., from the drifting bottom.

While oysters grow most rapidly upon or near muddy bottom, they are often in some respects objectionable if placed upon the markets directly from such beds. Some

planters, therefore, transplant them to hard bottom for several months before sending them to market, it being said that this improves their flavor and appearance by causing the muddy matter in the gills and mantle cavity as well as in the intestine, to be gradually cleared out and disgorged.

The bottom from which the oysters have been shifted is, of course, cleared of rubbish when the oysters are taken up, and may be at once utilized for fresh seed. Some oystermen prefer to let it lie idle for a year, supposing that this increases its fitness for a further crop, but there appears to be no good reason for this, though it may be that this course permits of a recuperation of the food supply on the fallow beds.

The length of time during which the plants are allowed to lie, depends upon the location of the beds, as affecting the rapidity of growth, upon the size of the seed planted, and upon the judgment of the planter. In many places "yearling" seed will be ready for the market in two or three years after being planted—that is, when the oysters are three or four years old—but, in exceptionally favorable localities, such as Jamaica Bay, Long Island, such seed is said to grow to marketable size in six months or a year. In some places it is said to now take a year longer for the oysters to mature than when planting was first practised.

As large oysters bring a better price than small ones, it generally pays to allow them to grow for a year or two after they reach a marketable size, but this is a matter which the planter will determine for himself, as conditions vary with the locality.

As the planter generally wishes to harvest a portion of his crop each year, it is customary to divide the beds into sections, which are planted in successive years in such a manner as may suit the plan of operations of the particular grower concerned.

PLANTING WITH CULTCH, COLLECTORS AND STOOL.

By these terms is understood any firm and clean body placed in the water for the purpose of affording attachment to the spat or young oyster. A great variety of objects have been suggested and used for this purpose, both here and abroad, and some of them will be discussed in their proper places in this article.

This method of oyster culture is that which was first adopted, and to it and its modifications we must doubtless look for future growth in the oyster industry. The oyster-

men long ago noticed that under certain conditions, not only did natural objects of various kinds become covered with young oysters, but other objects accidentally dropped overboard would often, when recovered a few weeks later, show a heavy set of spat. Naturally, they began to throw objects into the water for the express purpose of collecting the spat, and thus increasing the amount of seed available, and from this beginning the present system of spat collecting now in use in our waters was developed.

For this method of planting, it is, of course, essential that there should be in the vicinity of the beds, spawning oysters, either of volunteer growth or planted, and that the temperature of the water should be between 68 deg. and 80 deg. F., during a period of some weeks duration.

The bottom used for this method of cultivation should be firmer than that which will suffice for bedding well grown seed, though soft bottom may be prepared so as to be satisfactorily used. If the bottom is very soft, it may be overlaid with gravel or sand in the manner before described, and upon this the collectors or cultch may be deposited. In a moderately soft bottom the cultch can be applied without previous preparation other than to clear the ground of all debris which would interfere with working it. Hard, gravelly bottom in shoal water, which may be of little use in raising the adult oysters on account of the absence of food, may prove an excellent place for the collection of spat, and the same may be said of some places with a stiff clay soil.

One of the great difficulties in spat collecting is to avoid the deposit of sediment upon the cultch, as an amount of sedimentation which would have no effect whatever upon the adult oyster would prove absolutely fatal to the young spat. At the time of attachment the infant oyster is about one-ninetieth of an inch in diameter, and the deposit of a very slight film, either before or immediately after the falling of the spat would be sufficient to cause its suffocation. It will be seen, therefore, that a soft bottom, upon which the large oysters will thrive, or an amount of sedimentation which may favor the rapid growth of the adults from the food matter which it contains, will effectually, in many instances, prevent the cultivation of spat.

Oyster Shells.—In this country oyster shells are the oldest and most generally used form of cultch. They are usually merely spread upon the bottom, being thrown broadcast from boats in the manner which is described for planting seed

oysters. When the bottom is sufficiently hard to prevent their submergence, it is customary to spread them as uniformly as possible over the ground, so as to offer the largest available area for the attachment of the spat. Shells may be planted in all depths of water with equal facility. They are cheap and readily obtainable in all oyster regions. Clam and scallop shells are also used in the same manner. The quantity required to properly "shell" a bed depends, upon the nature of the bottom. When the ground is soft a larger number is necessary, because many become buried in the mud or covered up by the others.

Upon soft ground some planters apply a layer of shells a couple of months before it is time to apply the cultch proper. Those first applied sink a short distance into the mud, where they are suspended so as to form a more or less solid substratum, which supports the cultch applied later. A bed so prepared stimulates the natural banks, which in most places overlie a mud bed, that, in its upper portions, has acquired some consistency and firmness by the shells lying buried in it. After a muddy bed has been shelled for a number of successive years it will be found to become gradually firmer. Each year some of the planted shells become covered up and are left remaining when the oysters are removed, and thus it happens that the bottom of a well-handled planting ground improves with use.

When the oyster or clam shells are thrown from the boats they will be found to fall so that the convex side rests upon the bottom, and it is important that they should so fall. In most cases, if such cultch be examined, it will be found that nearly or quite the entire set of spat is upon the convex or lower side, where it is held clear of the mud and sheltered from the sediment deposited on the upper surface. In ordinary situations perfectly flat pieces of tile, shale, etc., would be vastly inferior to shells, for the lower surface would lie close to the bottom, while the upper would become covered with a muddy deposit from the water, and between the two the young oyster would have but scant opportunity for fixation.

It has been observed that when shells and gravel are spread upon the same beds the former usually catch the larger amount of spat, especially in years in which there is but a moderate set. The planters and oystermen attribute this to the fact that the shells project a greater distance above the bottom, and that, therefore, the fry come into contact with

them, first in their descent for attachment, but as the set is mainly on the convex side of the shell and therefore *underneath*, it will be seen that the true explanation of the superiority of the shells is that given above.

The quantity of shells sowed upon any given bottom will depend upon the judgment of the planter, the general rule being to sow more on soft than upon hard bottoms, for the reasons above stated. The usual quantity appears to be from 250 to 500 bushels of shells per acre, most of the planters using about 400 bushels per acre, except upon a very muddy bottom; but in Long Island Sound there is a tendency to use greater quantities. The cost of spreading ranges from one-half to two or three cents per bushel, according to the location of the beds and the cost of labor, etc.

The principal objection to the use of oyster shells is that they are so large that much more spat attaches itself than has room to grow, and at the same time the shells are so strong and massive that it is difficult to break them in pieces so as to allow for the expansion of the young. As a consequence, many young oysters which have successfully passed through the early stages of their fixed conditions are smothered or overgrown by their more vigorous fellows, which are themselves distorted by the crowding to which they are subjected. Many are thus wasted which would, under better conditions of attachment, have grown to marketable size.

For the reasons mentioned, scallop, "jingle" and other fragile and friable shells are, when they can be obtained in quantities, to be preferred. Such shells will break up under the mutual pressure exerted by the oysters during their growth, and the latter will then be liberated from the bunches and will tend to grow into shapely and desirable forms, with a smaller rate of mortality. When the currents or waves are very strong, frail shells may prove too slight to withstand their action, and the planter using them may find, to his surprise, that much of his cultch has been carried away. Otherwise, and for the reasons before stated, these shells appear to be well adapted to the process of sowing, and they can also be cheaply obtained in large quantities.

OTHER METHODS OF USING SHELLS.

It has been recommended or suggested that shells of various kinds could be strung upon wires, etc., suspended in festoons from stakes planted in the bottom. This would, of course, prevent their submergence in places where the mud

was very soft, but as each shell would have to be separately handled it will be found that this method is too expensive to be warranted by the present condition of the oyster business.

SCRAP TIN, TIN CANS, ETC.

In some places old tin cans and scrap tin of various kinds are found to give good results when used as cultch. They have the advantage of becoming corroded and gradually dissolving in the salt water, thus releasing the young oysters before they begin to crowd one another and allowing them to grow into well shaped adults. Moreover, as the cultch each year disappears in solution, there is no debris from this source to litter the ground and to cause the expense of culling. It seems, that in the form of old tin cans, this type of cultch might have some advantage on muddy bottoms where there is a rather rapid sedimentation. Such cultch is light in proportion to the surface presented, it would not readily sink, and the upper half of the interior, and to some extent the lower half of the exterior would present surfaces protected from sedimentation upon which the young oyster could lodge itself. By the time the can is disintegrated, the oyster would no doubt be sufficiently grown to withstand the action of the mud. The tin is distributed over the bottom as in the cases of shells and gravel.

BRUSH FOR SOFT BOTTOM.

When the bottom is so soft that ordinary methods can not be used, it will sometimes be found that fagots and brush make most efficient collectors. The brush is thrust firmly down into the mud in such a manner that the small branches are at some distances above the bottom. They will offer a large surface to the water, a slight current will tend to keep them free from destructive deposits of sediment, and water well charged with the swimming fry will almost certainly yield a full set of spat. The brush is lifted at the proper time by means of a crane or boom and windlass. This method was used with some success at Groton, Conn. The seed was left to grow to a marketable size on the brush, but owing to the liability of the large oyster to drop off into the soft mud below, it was sold as soon as possible.

OTHER COLLECTORS.

Many materials have been suggested as suitable for collectors, but the foregoing appear to be the only ones which have proven practicable on a large scale in our waters. Tiles and

roofing slates, arranged in various forms, have been found satisfactory by European culturists, but are apparently not adapted to use here, where labor is high and oysters cheap. Pieces of bricks, broken pottery and similar materials, may suggest themselves to the planter as local substitutes for shells and gravel. Hard-wood chips and bark might prove useful, but are hardly to be recommended.

COATING CULTCH.

To overcome the difficulty, which has been mentioned, of the set upon collectors being so dense as to interfere with its subsequent growth, it has been proposed to coat the cultch with some material which will flake off easily, either under the mutual pressure exerted between the growing oysters, or when it is scraped with a suitable instrument. This device was first used in France, where it was adopted to avoid the theretofore necessary breakage of the tile collectors. The coating is detached from the tiles with a chisel shaped instrument, somewhat resembling a putty knife. Apparently, this method has never been used in our waters, but where it is necessary to use oyster shells for cultch, it might, perhaps, be applied to advantage. In this case the fry could not be economically detached by hand, but there is very little doubt that the growing oysters would automatically liberate themselves. The coating used in France consists of a mixture of seawater, lime and sand, or hydraulic cement, "stirred to the consistency of thick cream." Various formulæ are used by different culturists, three of them being as follows:

1. One part quicklime, three parts fine sand.
2. One part quicklime, one part fine gray mud.
3. First a light coating of quicklime, and, after drying, a coat of hydraulic cement.

The coating should be such as not to readily wash off, yet sufficiently brittle to flake under the mutual pressure exerted between the growing oysters, and about one-twenty-fifth of an inch in thickness.

For convenience in coating, it is recommended that the shells be placed in a wire basket and dipped into the cement vat, the mixture then being allowed to set before the shells are used.

Whatever may be the character of the cultch, it should invariably be clean and without any surface deposits, which might tend to prevent the fixation of the spat. For the same reason the clutch should not be placed upon the beds long

before the season for setting. If it is placed in the water long before it is needed, the deposit of sediment is often sufficient to stifle the young oyster, but on the other hand, if the time is well chosen, a practically clean surface is presented and a good set is more likely to reward the planter.

It is known that cultch cannot be thrown down at random with any strong expectation of success. The water is not everywhere charged with the swimming fry, and the experience of planters has shown that they are often distributed in streaks or belts, which appear, to some extent, at least, to be conditioned by the currents. If clutch be placed in a current, it will, other things being equal, be more likely to catch a set than when in still water. Even a strong current does not appear to interfere with the fixation of the young, and as it brings a greater body of water into contact with the collecting surface, some of it is more likely to contain fry at the stage of fixation.

It is also obvious that the water is not likely to contain many fry unless there are spawning oysters in the vicinity, and it is, therefore, the part of wisdom to locate the collectors in the vicinity of natural or artificial beds containing mature oysters. Even where the oysters are so scattered as to hardly pay for working, it will be usually found that there is sufficient spawn fertilized to provide considerable seed, if it be given sufficient facilities for attachment. For reasons readily seen, it will be advantageous to locate the collectors so that the predominating currents sweep from the spawning oysters to the collectors. In some localities it will be found that the entire set occurs in the tidal zone; that is, in the area between low and high water. The reason for this is not yet fully understood, but if it should prove to be because the embryo oyster is lighter than the dense sea water, and, therefore, cannot sink to the bottom, or because the sedimentation is too rapid below low water mark, or almost any other reason, except the softness of the bottom, then the cultch must be confined to the area between tides, if it is to be effectual as a collector of spat. The most careful and uniformly successful oyster culturists do not depend entirely upon the spawn derived from neighboring beds, but usually distribute over the spatting beds a number of mature spawning oysters in the proportion of thirty to sixty bushels per acre, these being usually put down before the clutch, so that the oysters will become, to some extent, acclimated before the spawning season. As the cultivated area increases, it becomes unnecessary to use many brood oysters,

and in some places where they were formerly used, reliance is now placed solely on the floating fry derived from the mature oysters on neighboring beds. Upon theoretical grounds it would appear to be preferable not to scatter these "mother oysters" too widely. There would seem to be greater certainty of fertilization when the oysters are grouped, and there are ample time and superior facilities for securing distribution over the beds in the embryonic condition. The embryo exists for a period as a free-swimming form, and during that time it may be carried a considerable distance by its own exertions and the action of the currents. On the other hand, the eggs, and especially the spermatozoa, will probably die unless they fulfill their destiny within a much shorter period, and the sooner they are brought into contact with one another the better, and the smaller the bulk of water through which they are at first distributed, the larger the number which will accomplish successful union.

Upon these considerations is based the advice not to scatter the "mother oysters" too widely. Fifty bushels of oysters, 250 to the bushel, scattered evenly over an acre, would allow one oyster in every $22\frac{1}{2}$ linear inches in each direction, plenty near enough if they were all to spawn at one time, but it must be remembered that the proportion ripe at any one time is not so large, and there is a possibility of all the oysters over a considerable space being of one sex.

The "mother oysters" used for this purpose are preferably obtained from the neighborhood of the planting ground. Endeavor should be made to study the condition of the planting grounds, and to procure the spawners from beds as nearly as possible similar in the conditions of temperature and density.

Many planters are content to allow their beds to remain unworked until they are ready to market their crop, whether this be one, two, three, or more years. In some instances this may be satisfactory, but often, and perhaps usually, it is better to go over the beds with tongs or dredges, cleaning up the debris and separating the oyster clusters, or even in some cases removing the seed to localities in which the conditions are more favorable for rapid growth, for in many instances the best spatting grounds are not the most favorable for subsequent growth.

The stage at which the planter will find it most profitable to sell his oysters, depends much upon circumstances. Sometimes the set of spat will be greater than could be advanta-

geously grown upon the area covered and some of it could be manifestly removed to advantage. Some planters find it more profitable to sell their oysters as seed, thus receiving quicker returns for their investments and also lessening the possibility of losses due to the appearance of enemies or the advent of untoward conditions. In many cases it will pay the planters to specialize, some raising seed for sale to others who devote their capital and enterprise to the work of raising the oyster to a marketable size.

Even if the oysters are to be left upon the spatting bed, it is often better to work over the grounds during the first year, removing the debris and breaking up the clusters of young oysters, so as to secure a greater survival and superior shape. As has been already mentioned in treating of the planting of seed, it is often advisable to shift the oysters to other grounds during the last few months before marketing them, in order to fatten them and improve the flavor, and to cause the gradual disgorgement of mud from the intestine and mantle chamber. A keen watch should be kept at all times to detect the presence of enemies, spatting-beds being especially subject to the attacks of various enemies, which find in the vast number of thin-shelled young an abundant and readily obtained food supply.

PROTECTION FROM ENEMIES.

In the case of most of the enemies of the oyster, it is impossible to indicate efficient means of protecting the beds from their inroads. The impossibility of knowing at all times the exact conditions prevailing upon the bottom, the suddenness with which many of the enemies appear upon the beds, and the insidious nature of their attacks, all add to the difficulty which the planter finds in preventing the destruction of his property.

It is possible to protect oysters in shallow waters from the attacks of fishes, by surrounding the beds with palisades of stakes, driven into the bottom at sufficiently close intervals, to prevent the passage of fish between. Upon the Atlantic coast, the inroads of fish are not sufficiently formidable to require such protection, although the drum fish causes some loss to the planters, in the vicinity of New York.

The star fish is practically unknown in the Chesapeake Bay, but in Long Island Sound it is the most destructive enemy with which oystermen have to contend, and many methods, including elaborate apparatus, have been suggested

and tried there, to mitigate the evil. As our oystermen do not have these voracious fish to contend with, it is not necessary to discuss here the methods used.

The drills are the most destructive enemies of the oyster in the Chesapeake Bay and adjoining regions, as well as upon most of the more important in shore beds northward. The most destructive species is the form known to naturalists as *Urosalpinx cinera*. It is a snail like mollusk, which by means of its rasping tongue, drills a tiny hole in the shell of the oyster, through which it extracts the soft parts. It is only the younger oysters which are thus attacked, as after they become two inches long the shell is stout enough to resist this foe. The loss sustained from this source is very great, as the drills are often present in large numbers, and continue their work throughout the year. No method of proved efficiency has yet been devised for protecting oyster-beds from the inroads of the drill, but by systematic attention something could no doubt be done to lessen its destructive effects. In culling the oysters brought up in the dredge or tongs, care should be exercised to destroy the drills. Most of them, however, will pass through the intervals of an ordinary dredge, and to obviate this a finer bag might be used within the dredge. This could be used especially in cleaning up the beds preparatory to planting. It should be remembered in this connection that it is possible to infect new grounds with the drill by its transportation thereto with the seed. The most promising method which has yet been proposed for catching this enemy is a machine invented by Captain Thomas Thomas, of New Haven, Conn. By its use, when dragged over the bottom, the varied material on the beds undergo a process of screening, the oysters being automatically returned to the bottom, while a large portion of the debris, including the drill, is held and brought to the surface. That the device will accomplish this, has been demonstrated, but whether the drill can be successfully fought by this means has still to be shown.

The conch or winkles have never been a serious menace to our beds. Their small numbers and large size and the large size of their eggs make it possible to successfully fight them by destroying all winkles and egg cases brought up in the process of dredging or tonging.

The growth of sponges, hydroids, etc., when so rank as to threaten the growth and welfare of the oysters, may be kept down by working over the beds with the oyster dredge and culling out the debris. A thorough cleaning up of the

ground before planting, and the use of clean seed and cultch go far toward the prevention of trouble from this source.

In places where eel-grass (*zosters*), etc., grow so rapidly as to cause stagnation of the water and suffocation of the oysters, some means must be adopted for its removal. Sometimes it may be removed with an ordinary scythe at low water. A grower in New Jersey has invented for this purpose what has been termed an "aquatic mowing machine," which, when submerged in the water and the power applied from the operating vessel or scow, by a combination of knives, cuts rapidly a swath twelve feet wide. It is able to mow an area of 2,000 square feet per minute, or an acre in from twenty to twenty-two minutes.

INCREASE ON PLANTED BEDS.

The percentage of seed oysters which reach maturity depends upon local and seasonal conditions, upon the care with which the oysters have been planted and worked, the size of the oysters when planted, and the length of time which they have been left to lie. Under the very best conditions there is a considerable mortality among the plants, and while the individual oysters have increased greatly in size, the loss from one cause or another is such that there is by no means a corresponding product, in the total increase as measured in bushels. In some places the planter is satisfied if he can market a bushel for each bushel planted, depending for his profit upon the increased price brought by the larger growth, but the usual average yield in many localities is two or three times this amount, and cases are known where 500 bushels of shells have yielded 3,000 bushels of saleable oysters.

GROWING OYSTERS IN PONDS.

There are many localities within the oyster-producing region of the United States, where pond culture for the purpose of growing and fattening oysters would probably prove successful, and salt ponds connected with tide water by natural or artificial channels, could often be made to return a good dividend to their owners, if converted to the uses of oyster culture. In other cases low and swampy land might be dredged or excavated so as to answer the purpose, and thus be made to return a revenue, in perhaps the only possible manner.

Such ponds should be well protected by embankments sufficient to prevent the entrance of water except when

desired, the supply being regulated by flood-gates which can be opened or closed at will, or the height of the embankments may be so adjusted that the water from the sea will enter during very high tides only, say once or twice a month. When the ponds are large it is found that the surface aeration is sufficient to supply the oxygen required, but in smaller ponds it is necessary to attain this end by more or less frequent interchanges of water between the pond and the main body of salt water with which it is connected. In the case of practically inclosed ponds it is necessary to provide for the addition of water to make good the loss occasioned by evaporation. If this precaution be neglected, the density of the water will rise above the maximum in which the oyster flourishes. It may be advisable in some localities to reduce the density in the ponds below that in the open waters, as it is well known that the more brackish waters are generally most favorable to the rapid multiplication of vegetable forms, valuable to the oyster grower.

There are, of course, many places where the natural conditions for the production of oyster food are all that could be desired, and there pond culture would, no doubt, be unnecessary, but in other localities it seems to offer the most promising field for experiment.

BREEDING OYSTERS IN PONDS.

While in some of our most important planting regions there is rarely any difficulty in obtaining seed oysters, there are places, otherwise admirably adapted to the industry, in which the supply of seed is extremely precarious. In certain localities on Long Island a set of spat rarely occurs, and the planters long ago abandoned the attempt to raise seed, and now procure it from some other region more favored in this respect. In still other places, as over the larger part of the Chesapeake bay, the seed oysters are obtained mainly from the natural beds, but with the depletion of these there will be an increasing difficulty in obtaining it, and before long it will, no doubt, be necessary to derive it from some other source. There is an increasing tendency in the Chesapeake region to follow more closely the method of sowing shells, practiced in Connecticut. In some places the experiment has met with great success, so far as the procuring of a set of spat is concerned, but in other localities the results are too uncertain to permit it to be followed with profit. It is obvious that in order to obtain more certain results the conditions upon which the

spatting depends should be subject to some control. It is useless to expect such control in any adaptation of the ordinary method of planting shells, and the only direction which promises success in such an attempt is some modification of pond culture. In the United States Fish Commission Report, 1885, the writer says: "To actually come into competition with the system of shell sowing in deep water, we must proceed to abandon all old methods, condense our cultch so as to have the greatest possible quantity over the smallest possible area, and finally have that so arranged that the currents developed by the tides, in consequence of the peculiar construction of a system of spawning ponds and canals, will keep the cultch washed clean automatically. Unless this can be done, all systems of pond or cove culture for the purpose of obtaining spat must unhesitatingly be pronounced failures."

Impressed by these facts, Dr. Ryder, in 1885, devised a very ingenious method of spat culture, which was tried by the United States Fish Commission at St. Jerome's Creek, Md., but it was found that Dr. Ryder's expectations regarding the freedom of his apparatus from sedimentation were unfounded. St. Jerome's creek is admirably adapted, from its rich food supply, to growing oysters from seed, but its very advantages in this respect operated against the success of the experiment of spat raising. A small set was obtained upon some of the cultch exposed, but the deposit of sediment was so rapid that the young oysters were unable to fix in quantities sufficient to make the experiment a success. It seems probable that under more favorable conditions with respect to sedimentation the apparatus would prove a useful one, and it is to be hoped that it will be given a further trial.

Artificial propagation in the fish culturist's sense, the raising of oyster fry from artificially fertilized eggs, has at the present time no place in practical oyster culture. It may, perhaps, sometimes demonstrate applicability to a system of spat production in small, closed ponds, but it can have absolutely no use in the present methods of oyster growing. When some successful method of close-pond production be devised, then artificial propagation may find a field of usefulness.

ARTIFICIAL FEEDING.

There is no practical way now known of furnishing oysters with an artificial food supply. Experiments have been made with a view to feeding the adult oysters upon cornmeal or some other similar substance, but such attempts have been o

no practical value. There is no doubt that they would eat cornmeal or any other substance in a sufficiently fine state of division to be acted on by the cilia. The oyster is incapable of making a selection of its food, and probably any substance, nutritious, inert or injurious, would be swept into the mouth with complete indifference except as to the result. Cornmeal and similar substances would doubtless be nutritious, but their use must be so wasteful that the value of the meal would be greater than that of the oyster produced. The only way in which the amount of oyster food can be increased is by so regulating the conditions in ponds or oyster parks that the natural food may grow in great luxuriance. In artificial propagation the life of the young has been prolonged beyond the early embryonic stages, by feeding upon certain marine algæ reduced to a powder by pounding them in a mortar, but such successes have been purely experimental and are of no significance from a practical standpoint. Even if artificial propagation were to obtain a place in practical oyster culture, the fry would doubtless be liberated before resort to artificial feeding would become necessary.

FATTENING, PLUMPING, FLOATING.

As has been frequently pointed out, the so-called "fattening" of oysters for a short time previous to sending them to market is not a fattening process at all, but is a device of the trade to give to the oysters an illusive appearance of plumpness. It adds nothing whatever to the nutritive qualities of the oyster, but, on the contrary, injures the flavor and extracts certain of its nutritious ingredients. However, as long as the public desire such oysters, the dealers cannot be blamed for supplying them. The process of plumping consists in changing oysters from denser to less dense water, causing an interchange of fluids through the walls of the animal, the denser fluids in the tissue passing slowly outward, the less saline water in which the animal is immersed passing more rapidly inward. The oysters are not usually placed in absolutely fresh water, which would kill them if exposed too long, but in fresher than that in which they have been living. Although larger after plumping, the oyster has lost 13 per cent. of its nutritious substances. Sufficient water will be taken up, however, to increase the total weight of the oyster from 12 to 20 per cent. The same result is produced by placing the oysters in fresh water after they have been taken from the shell. It will be seen that what the oysters have

gained is simply water, and of no value as food. Oysters may, and no doubt sometimes do, consume disease germs with their food, and such germs transferred to the human economy may have upon occasions serious results. Care should therefore be taken to put the apparatus for plumping them in such places as are free from the contaminating influence of sewer discharge and other sources of pollution.

In France the oysters are subjected to a true fattening process in inclosed ponds or claires, their flavor and appearance being much improved thereby.

GREENING.

Notwithstanding that almost every recent writer upon this subject has insisted upon the harmlessness of the green coloration which is frequently observed in certain portions of the oysters, there is still considerable misapprehension of the subject by consumers and oystermen alike. The prejudice is confined to America, in Europe such oysters being regarded as superior and much trouble being taken to impart to them their peculiar color. In our waters the greening is liable to take place in certain localities and at irregular times. Rather shallow water appears to be more susceptible to the production of this effect than the greater depths, but it has recently appeared on the deep-water beds of Long Island Sound. When oysters become so colored, the oystermen find great difficulty in disposing of them, owing to the popular belief that they are unfit for food or even poisonous. They often have what is called a coppery taste; uninformed persons usually assume that the green color is due to the presence of copper. A number of careful investigations have shown that such oysters contain no copper whatever, but that the green color is derived from a harmless blue green substance, *phycocyanin*, which is found in certain species of the lower plants. Under proper conditions these vegetable organisms multiply in brackish or saline water with great rapidity and provide an important item of food to the oyster. The green matter is soluble in the juices of the oyster and passes into the tissues affecting, principally the blood corpuscles. An oyster usually shows the first indication of greening in the gills and palps, and frequently this is the most highly vascular portion. When the supply of greening food is abundant and long continued, the entire organism, with the exception of the muscle, will eventually acquire a green hue. Such oysters are usually, but not always,

fat and well fed, the result of the abundant supply of nutritious food, and such a condition could hardly be obtained were the dye a copper product, such as has been popularly supposed. The color may be removed from the oysters by transferring them for a short time to waters in which the green food is deficient, a fact which may be available in preparing for market oysters, which popular prejudice refuses to use in the green state. In conclusion, it may be again insisted that the greening is not a disease, nor a parasite, nor a poisonous material in any sense.

Dr. W. K. Brooks, an eminent authority on the oyster, is a strong advocate of the systematic culture of the oyster as the surest means of combating the threatened depletion of the beds consequent on the continuous drain upon them. In a recent article on the subject, he says, in part:

"It will take many years of labor to bring the bay under thorough cultivation, and it will require a great army of industrious and skillful farmers, and great sums of money, but the expense and labor will be much less than equal area of land requires; and while it may be far away, the time will surely come, when the oyster harvest of each year will be fully equal to the total harvest of the last fifty years, and it will be obtained without depleting or exhausting the beds, and without exposing the laborers to hardships or unusual risks. Our opportunities for raising oysters are unparalleled in any part of the world, and in other countries much less valuable grounds have by cultivation been made to yield oysters at a rate per acre which, in our own great beds, would carry our annual harvest very far beyond the sum of all the oysters which have ever been used by the packers of Maryland and Virginia. We have never enjoyed the hundredth part of our advantage, nor can we do so if we continue to rely upon nature alone, and this fact, which has been proved again and again by statistics, is perfectly clear to anyone who knows what an oyster is and what are its relations to the world around it. There are many reasons for believing that the growth of oysters is limited by the supply of lime, and, that all other necessary ingredients of their food are so abundant, that an increase in the supply of lime would cause more rapid growth, greater safety from enemies and an increase in the number of oysters. A very considerable portion of lime is imparted to the waters of the bay by the decomposition of old oyster shells. We save up our egg shells to feed laying hens, but we waste our oyster shells in

every possible way, and treat them as if they were of no use. The value of these shells as food for the oyster is very great, and this alone should lead us to return them to the beds. By decomposition when thrown in the water they have all gone back, in a few years, into a form which makes them available as oyster food, and they soon begin to be transformed into new oyster shells, and if all the shells could be returned to the beds, this source of supply would be greatly increased.

"The immense area covered by our own beds have enabled them to withstand the attacks of the oystermen for a long period, but all who are familiar with the subject, have long been aware that our present system can have but one result—extermination. In view of these facts, no one who appreciates the magnitude of the oyster industry of the Chesapeake Bay, can doubt that the protection of our beds is a matter of vital importance, for it is quite clear that we cannot trust to the natural fecundity of the oyster.

"A natural bed tends to remain permanent, because of the presence on it of the oyster shells. This being an admitted fact, it clearly follows that shelling the bottom where there are no oysters furnishes us with a means of establishing new beds or for increasing the area of old ones. The oyster dredgers state with perfect truth that by breaking up the crowded clusters of oysters and by scattering the shells, the use of the dredge tends to enlarge the oyster beds. This, however, is a very rough and crude way of accomplishing this end. (Dr. Brooks here gives a description of the various ways of collecting spat, etc., which have been described above by Mr. Moore.)

"At present no spat collector seems better adapted for use in our waters upon hard bottoms than the oyster shells, and they are now the cheapest collectors that can be used. The use of tiles has recently been introduced in France, and as they can be used in deep water, they are well adapted for use in our bay. Those used in France are much like a common drainpipe sawed in two longitudinally. They cannot be obtained in our market at present, although they could be made very cheaply, if there were any demand for them. The French oyster breeders coat these tiles with thin whitewash, which can be sealed off with the young oysters when they are large enough to be distributed upon the planting grounds.

"There are few parts of the world which offer advantages for the prosecution of oyster culture equal to those afforded by the bay, and there is no other place where these advantages are presented on such a great area of bottom. The

number of oysters which the bay might be made to furnish annually is almost too great for computation. All that is needed to make this great source available is for our people to engage in oyster culture. When they do this and reclaim their property which is now going to waste, a new era of prosperity will be introduced, and the oyster culture will be developed with great rapidity. The culture of oyster in the deeper waters of the bay, and the establishments of new oyster beds by collecting the floating spat upon clean shells and other proper substances, is very much more important than the encouragement of oyster planting, but it is easy to see the very great advantages which we should derive from a thorough system of planting. Deep water cultivation cannot be undertaken on a small scale, and it requires both capital and expensive appliances, but oyster planting can be carried on without any great expense, and as success in it depends to a great degree upon constant, intelligent supervision, small cultivators will always have the advantage over those who attempt more extensive operations. The most serious obstacle to the development of a great planting industry in Maryland is the absence of all respect for private property in oysters."

Dr. Brooks speaks very favorably of the inclosed pond or "claire" system of culture, as operated in France.

A few figures taken from the annual report of the "Shell Fish Commissioners" of the State of Connecticut for the year 1897 will give some idea of the extent of the oyster planting industry in the waters of Long Island Sound and tributaries.

During the year ten oyster "farms" reverted to the State for the failure to pay the tax due for five consecutive years. These farms aggregate 776 acres. There were 541,444 cubic yards of material dredged from the rivers and deposited on the oyster grounds, subject to the supervision of the State Inspectors. There are 250 parties who have oyster farms within the jurisdiction of the State, the farms comprising a total of 66,746 acres. There are eighty-one steamers engaged in the business, with an aggregate capacity of 79,800 bushels, besides 349 vessels licensed to work upon the natural beds. The amount of material put on oyster beds by cultivators during the year was as follows: Bushels of shells planted, 2,262,570; bushels of gravel and sand dredged and planted, 3,687,151; bushels of Bridgeport natural bed set of 1897, 220,135. Total number of bushels planted, 6,179,591.

The various farms are separated by buoys, stakes, etc., whilst the State maintains a complete system of signals, landmarks, etc., for determining boundaries, etc.

The report says: "While the business as a whole has not been up to the mark of some former years, it has been good in particular lines, the demand being fair at remunerative prices. The oyster openers of New Haven have done a good business, and so have the dealers in unopened oysters generally. *Every year the aggregate of oysters taken from the beds on the Connecticut coast and carried to Rhode Island, Long Island and elsewhere, for maturing, grows greater, and the seed oyster business increases.*

The State of Connecticut will grant a perpetual franchise to cultivators on any undesignated area for the purpose of cultivating shell fish, provided such area has not been a natural bed for ten years past, upon payment of \$1.00 per acre. Should the ground not prove suitable, the State will refund the money to the purchaser.

Subjoined will be found several letters from gentlemen living in the oyster region of Maryland. They were written in reply to inquiries from this Bureau, and it will be seen that they forcibly express their views and that they practically coincide in their opinions as to what is the best means of arresting the depletion of the beds and materially increasing their production. The first letter is from a gentleman in St. Mary's county. He says:

ST. MARY'S COUNTY, MD., }
December 29, 1897. }

CHAS. H. MYERS, Esq.

DEAR SIR—In answer to your request, asking my views on the oyster question, I will give you my ideas, in part, at least. My home is on a point of land, between the St. Mary's and St. George's rivers, where both streams empty into the Potomac by the east end of St. George's Island. The oyster industry is a big one herabouts, about two-thirds of the population being engaged in it. I am informed by the oystermen that oysters are very scarce, and each year finds them more so than its predecessor. Many oystermen, perhaps two-thirds of them, think that two months should be taken off the open season—one month in the fall and one in the spring. I, myself, am decidedly of this view, for oysters in our waters are never fit for use in September, and men wade about, pick them up and "lay them down," as it is called, but they do not fatten, when moved from one position to another in this way during that season, and never, if laid down in thick beds, as they usually are, to facilitate getting them up when needed for sale. This is wasteful, and it is hardly fair toward many

oystermen who work small farms and have their fodder and corn to save, wheat to seed, etc. Men who are engaged more largely in farming, find it difficult to get labor in the important month of September, because of the fascination there seems to be in oyster catching. Those to whom the law gives the right to stake off five acres, should have protection, and in case of conviction, a fine should follow arrest for encroaching on that right. The party injured should have the benefit of the fine, at least to double the amount of the injury to his property.

In regard to leasing the oyster beds, either in part or in whole, I am opposed to it *in toto* for several reasons, as follows: If leasing the beds should become an accomplished fact, in less than a quarter of a century the greater part of our "beds" would be gobbled up by capitalists, and the poor would then, in reality, have no right scarcely that the rich need respect. It would be making serfs of the poor and robbing them of the inherent right of fishing, which man may regulate, but abrogate, never. I do not believe that all the power of the State in this county could protect any lessee of oyster beds in his so-called rights, and it would be sure political death to any man or party who would be instrumental in putting the oyster lands in the possession of a few capitalists. Not only would the oystermen revolt against such a law, but thousands not engaged in the trade would be in open sympathy with them, my humble self among the number.

I am aware that the argument can be used unless something be done, the oysters will in time be exterminated. I will say in reply to this, that if the man who owned the goose that laid the golden eggs had a right to destroy his valuable bird, so have they who own the oysters and live by them a right to destroy them, if they see fit. When that time comes to pass, by their own act they will have to seek other occupations, and while the transition state would be a severe ordeal, I doubt not that in time the State would be benefited by the improvement of the land in which the poor oystermen of to-day would have an interest.

In regard to the status of the oystermen, I would say that the majority of them are poor, and accumulate nothing when oystering is their sole occupation, for it takes all their earnings to support their families. There are many, however, who blend oystering with other pursuits, and who have become independent and well-fixed financially.

Our local oyster police boat is only in our waters for a few months, public service requiring her elsewhere. About the

time she leaves the harvest begins for seed oysters, and our beds are about cleaned up of both large and small oysters, and shells as well. If this was prevented our oysters would not be exterminated for many years, otherwise they must be annihilated at no very remote period."

A prominent gentleman of Somerset county, thoroughly conversant with the oyster business, in writing to this Bureau gives his views on the subject as follows:

"The principal industry of this section is oystering. This district is situated on a peninsula between the great Annames-six and Manokin rivers, and any legislation affecting this great industry, for or against it, is of vital importance to wage-earners here. We have, in my opinion, on our statute books all the laws that are required, if they were strictly enforced. The principal one of these is the cull law, which, if rigidly enforced, would do much to remedy existing evils. Oystermen say that this law should especially be enforced on the 'rocks.' It cannot be done at the wharves, in the packing houses, nor on the steamers which carry the oysters to market. It must be enforced on the natural beds, bars or rocks from which the oysters are taken. To do this, would, I think, be a very easy matter. When the season opens with 'tongs' the police fishery boats should go to the men on the rocks and see that their oysters are properly culled. Should they find that they are not culled, they could arrest those in whose possession such oysters are found. Only a few such arrests would have to be made before the 'tongmen' would see that it was to their advantage to return the small oysters to their natural beds or rocks. This should also be done in the case of the 'dredgers' who start to work later in the season. Compel them also to properly cull their oysters, and for failure to do so, mete out to them the same punishment that is imposed on the 'tongmen.' If this was done, it would not be very long before the cull law would regulate itself, and it would be found that very few small oysters would be thrown upon the market.

An oyster-bed needs cultivation just as much as a field of wheat or corn, and the later a bed is cultivated prior to the time the 'spat' permeates through the water, the better condition the shells on the bottom will be in to catch the floating spat. It is stated that a few years ago one or two gentlemen in Virginia conceived the idea that it would be a good plan to take off the cotton bag nets from their dredges, and then, just before the season when the oyster casts off the 'spat' to run over their beds with their dredges, the teeth acting as a

rake, which would thin out the oysters where they were too thick and distribute them evenly over the bottom. Give oysters and shells a thorough cultivation in this way, and it will be the means of thoroughly cleaning the shells of all slime, mud and foreign matter, and leave them in excellent condition for catching and holding the 'spat' when it begins floating about. It is stated that the gain in the yield of the beds which were worked in this way was nearly three hundred per cent.

We had a good illustration of this in this section a few years ago, when crabbing by scraping on certain bottoms of the Manokin was engaged in. At that time there were few oysters on these bottoms. The men in scraping would catch a few oysters and shells, and, according to the law, were compelled to throw them overboard. The boat being in motion all the time, the returned oysters and shells were scattered about over the bottoms, which were then barren and bare. Today it is almost impossible for them to work on these beds during the crabbing season on account of the vast quantity of oysters which have grown and accumulated by reason of their previous scraping. In scraping for crabs they keep the shells on the bottom thoroughly clean and ready to catch the 'spat,' and on one shell you will sometimes find at least fifteen or twenty oysters. When these oysters become two years old, they drop from the old shell and form a nucleus for a new oyster rock.

The majority of our oystermen say that Tangier Sound should be closed to all dredging until the 15th of January, and then only worked until the 15th of April each year. Their reason for advocating this important measure is, because our 'dredgers' at present commence working in the sound about the first of October, and continue without intermission until about the first of January, when they go to the Potomac or up the bay, leaving the rocks in a bad condition, as the oysters and shells become filled with slime and mud to which the spat will not adhere. Another reason, and a very important one, is that when they first start to work, they catch up the small growth, and these are sold to the various packing houses, whose proprietors plant them and take them up after they have grown to a proper size. It is stated as a fair estimate, that a bushel of oysters taken from Tangier Sound in October, would, if they had been allowed to remain in the water until January 15th have naturally increased to three bushels. Still another reason is, that where our boats are

now only working in the sound until January 15th, then they could work until April, which would be a benefit to their owners and families, for the simple reason that during the good weather months of October, November and December, they could be working in the Potomac and in the bay, whilst during the extremely bad weather, they would be near their homes and their boats almost on the rocks. The people in this section hope that the Legislature will take this matter in hand and thoroughly consider it.

It is of the greatest importance that we should have a thoroughly efficient police fishery force, to enforce the law without fear or favor, the officials being conscious that their acts will be thoroughly supported by those having judicial authority. One of the oyster navy officers, in conversation with me a short time since, said: 'What is the use of us making an arrest? Nine cases out of ten, if the man is convicted before a magistrate, he takes an appeal, and upon some technicality or other, the man eventually goes free. The decisions of the magistrates, in these cases, should be just as it is when a judge pronounces sentence upon a man for some criminal action. The justice of the peace should have more jurisdiction in oyster cases.'

There should be some kind of a law for the propagation of the oyster. What would be the best form or measure, it is hard to say. Whether the planting should be done by the State or by the individual, is a matter for further and full consideration. At present it is not a popular move in this section. I think though that the day is not far distant when oystermen will take a very different view of this matter. There is one thing certain, something must be done; oysters are growing scarcer, and the men can hardly pay their expenses. The principal part of the season is over, and they have made nothing. Some of them are in building and loan associations, and their houses are mortgaged. In some cases their all will be taken from them. Oystermen are a hard working and temperate set of men, contrary to what part of the press of the country tries to make them out. In the oyster industry we want good laws and competent and fearless men to enforce them."

In a postscript the writer of the above says: "No man should be allowed to oyster without a license. A large number of men are to-day catching oysters without a license. It should be the duty of the clerk of the court to send a list of those who obtained licenses the previous year to the different magistrates, that they may know who have been licensed

in their respective districts, and after a reasonable time every man who has not obtained a license should be compelled to do so, or make affidavit that he does not intend to catch oysters during that season. In 1894 there were issued in Somerset county, 800 tonging licenses, while during the present season not quite 300 have been taken out, so it will be seen that there is some cause for complaint."

Another gentleman writes that in his opinion "scraping for soft crabs should be regulated by law, as the said scraping drags the young oysters off into the mud, where they die." (This view is diametrically opposite to that of the writer immediately preceding, who thinks scraping is a benefit, and cites good reasons therefor. Doubtless local conditions have much to do with the matter).

He also thinks that the State should shell the bars and beds, and protect the same until the oyster is matured. The catching season, he thinks, should be materially shortened, and the culling law rigidly enforced on the bars and rocks where oysters are taken.

The above suggestions, the writer thinks, if embodied in appropriate laws, would go far toward ameliorating the evils which those engaged in the oyster industry at present complain of.

A gentleman living in Baltimore, who has been engaged in the oyster business for many years, in connection with large packing houses, and is thoroughly familiar with the subject, gave his views on the present status of the industry as follows:

"At the present time the beds are in good condition, and the yield fair, when the large number of those engaged in the fishery is considered. The much abused dredge, instead of being an unmitigated evil, has on the other hand been productive of much good, inasmuch as by its operations it has thinned and spread out beds where oysters were lying on top of each other, much to their detriment as to quality and size; and besides, when in this overcrowded position many of them die for want of room for proper growth and development. In the thinning out process spoken of, the dredge acts as a rake, and the oysters are more evenly spread and over a much larger area than before, thus largely increasing the size of the bed and consequently its productiveness. It is claimed that in this way the territory of the oyster-beds has been largely increased in the past twenty-five or thirty years.

The celebrated Point Lookout beds, on the Maryland side of the mouth of the Potomac, which were nearly depleted

some years ago, by unlimiting fishing, now show signs of rejuvenation, and if properly used will doubtless soon be as prolific as in the past, when they were in such demand on account of size and quality. The depletion of these beds was accomplished sometime before the State Oyster Navy was as large or efficient as at present.

Oysters from the Potomac, which are always favorites, are quite plentiful this season, fat and finely flavored. Oysters are found in the Potomac in quantities as far up as Cedar Point, about fifty miles from the mouth of the river. The largest portion of these oysters go to Washington, Alexandria and neighborhood, and thus escaping Maryland measurement, are lost to the statement of the annual output of Maryland waters.

The beds in the Nanticoke River are very prolific at present, so much so, in fact, as to be a disadvantage, as the oysters are crowded for want of room to attain their normal growth and size.

In the early part of the season of 1897-98 a schooner arrived at Baltimore having on board a cargo of 1,000 bushels of oysters which were caught on the western shore of the bay, on the Calvert and Anne Arundel beds. A remarkable circumstance connected with this cargo was that over one-third measured out as selects. It was the subject of general remark, being considered good evidence of the condition of the beds and the good quality of the oysters they are now producing. All that is necessary to insure an increased quantity of oysters in the bay and tributaries is a rigid enforcement of the cull law on the rocks or bars—that is, to immediately return to the water, when caught, all oysters which measure less than two and one-half inches from the hinge to the mouth. This law, if enforced rigidly as suggested, will do more to increase the production of oysters than any other legislative enactment that has been spoken of.”

In giving figures in reference to the output in oysters of the bay, there is a fact which is apt to be lost sight of and that may in a large measure account for any apparent decrease in Maryland's annual crop. That fact is the railroad facilities now enjoyed by the eastern shores of Maryland and Virginia, notably the branch of the Pennsylvania Railroad which starts from Cape Charles, and runs fast trains to the North and West. Oysters caught in the lower part of the bay adjoining this section, formerly nearly all found a market in Baltimore, and were either canned or sent raw to points West and North.

This trade in this section of Virginia and the lower part of the Eastern Shore of Maryland is now nearly all monopolized by this railroad, and Maryland thus loses the credit which used to be accorded her of production of an immense quantity of oysters shipped by this route.

Norfolk, prior to the completion of the Norfolk and Western and Chesapeake and Ohio railroads, did a comparatively small trade in oysters, it being mainly of a local character. At the present time, there are shucked at that place for shipment west, by the railroads mentioned, over 100,000 bushels weekly. Besides this, large quantities are taken by the various canneries. These immense quantities of oysters, most all formerly came to Baltimore, and Maryland got the credit in the statistics. It can be very readily seen that this materially affects the amount of Maryland's production in statistical tables, and goes far in accounting for any apparent diminution.

Of late years it has become quite a popular thing to ship oysters in barrels from down the bay to Baltimore by the several lines of steamers, and it is estimated that from 7,000 to 8,000 barrels are received in this way daily. These escape measurement by the inspectors, and are lost as regards statistical purposes, except by estimate or approximation."

CHAPTER X.

THE COAL INDUSTRY OF MARYLAND.

Maryland though small in area as compared with most of our other States, is rich in its natural resources, one of which is coal. A spur of the great Allegany range of mountains, which provides the backbone of its western part, holds within it the abundant supply of bituminous coal which has made Maryland coal famous the world over, wherever coal is used for the purposes of raising steam. This coal is generally known as "Cumberland" coal, taking its name from the city of Cumberland, which, lying at the eastern foot or slope of these mountains, and being the western terminus of the Chesapeake and Ohio Canal, as well as the junction of several lines of railroad reaching the coal regions above, has for years past been the centre of the coal shipments of the State. And yet the term "Cumberland" coal is a misnomer, as there is not a coal mine anywhere within ten miles of the city. This is also in many cases very misleading, as by this our coal is often confounded with the "Cumberland" coal of other regions.

It is a well known fact that when an article by force of its particular merit is in very great demand, others, said to be "just as good," are sure to be offered; the temptation to deceive by name or otherwise exists, and by these means to enforce the sale of an inferior article. This is especially true as regards the coal of Maryland.

We hear of various "Cumberland" coals, from West Virginia, Pennsylvania and Tennessee, and even from Nova Scotia. This could be avoided by using its proper name of "George's Creek" for Maryland's coal. This could be greatly assisted by the mining companies and their sales agents, by strictly using, enforcing and explaining to prospective purchasers, their reasons for adopting the proper name of "George's Creek," and thus not only correct a misnomer, but aid in advertising Maryland's famous coal product. This would be strictly correct.

The coal beds that lie in the mountains, through whose tortuous valleys the waters of George's creek pursue their rocky and tumultuous way to their union with the Potomac river,

at Piedmont, West Virginia. The coal field occupies an area of about twenty-five miles long, by about five miles wide, lying between Savage and Dan's Mountains. It is located in Allegany and Garrett counties, and extends from the Potomac river, at Piedmont, to the Pennsylvania State line, though only about one-half of this area has been developed by mining operations.

A transverse ridge (upon which the city of Frostburg is located) connects the Savage and Dan's mountains, and this divides the basin into two parts, and causing two opposite directions of drainage. The northeastern portion being drained by Jennings's run and tributaries, while the western portion of the basin, forming about three-fourths of the mining operations, is drained by George's creek and its tributaries.

It is evident that during some period of the earth's history, Savage Mountain and Dan's Mountain formed a whole, but at some period during the unknown and mighty past an eruption of nature occurred, which burst it asunder, thus forming the valley of George's creek. The coal developments having so far been confined to the mountain sides of each mountain, the bottom of the valley has been left as yet entirely undeveloped. The coal in this valley extends to a depth of, as so far known, about 350 feet, with several veins of coal of various thicknesses. The mountain ranges also contain veins of coal of various thicknesses, the most important of which, and the one principally worked, is known as the fourteen-foot seam. The location of these immense beds of steam coal, being so near the eastern markets and but 180 miles from tide-water at Baltimore, greatly increases their value and importance. Nor is there anywhere in the known world a coal with such superior qualities, located so well for economical mining and shipping.

There are but few openings reached by a "slope," the greater majority being worked by "drift" openings—that is to say, a horizontal drift cut directly into the coal from the face of the mountain, and from the mouths of these drifts the coal is run to the tipple and loaded into the railroad cars. Where the railroad lies a considerable distance below the mines, the coal is run down to the tipple by means of inclined planes.

In this lovely and romantic valley of the George's Creek, for some sixty years past, coal has been brought from the great store-houses of nature to the extent of some ninety million tons, at a cost of more than seventy million dollars.

The total area of this coal field is estimated at about 44,000 acres, of which over 17,000 acres contain the fourteen-foot vein, in addition to the smaller veins, which run through the entire field.

Many of these smaller veins are of no practical value, being from a few inches to $2\frac{1}{2}$ feet in thickness. In ten beds, however, the grand total amounts to 54 feet. The most productive and the one which commands the greater part of the attention of the mining industry, being the before-mentioned great "fourteen-foot bed." Such a bed of coal as this is exceptional, and is particularly remarkable for its regularity of form, uniformity of thickness, the few breaks found in it, and the ease with which it is traced. The name of the "fourteen-foot bed" is usually given to this vein, and in the lower end of the basin it has been found of that thickness and so worked; but this name gives an incorrect impression of the amount of coal actually obtained from it. In the mines now worked in the eastern end of the basin, the real thickness of the bed is about eight feet. In the central portion of the basin, although the thickness of this vein may reach twelve feet, until within the past three or four years, there is hardly a mine in which it can be said that more than ten feet of coal has been worked to any extent, while most of them have saved only about seven feet six inches. The western end of the basin is similar to the eastern, and the veins runs somewhat in the same proportion.

The lower portion of this coal bed contains two small seams of slate, each about one inch thick, and for years many of the operators selected the choice or middle coal, and sacrificed the rest, which is technically known as "bottom" coal. The waste sustained by the adoption of this method had for some time been realized, but with the adoption of improved systems, the loss of such a great amount of valuable coal has been largely prevented. It is said that by the exercise of proper care in separating the slate, no damage results from mining the bottom coal, the seams of slate running with remarkable uniformity, being easily separated from the coal.

In some mines the slate roof over the coal bed, after the coal has been taken out, is liable to fall in blocks, or "slips," and this is a source of constant menace and danger to the miners. In traveling through the coal regions and conversing with the men engaged in the work of mining, it is remarkable to find how many men have suffered at one time or another

by accidents. It would be difficult to find a man of middle age, who has steadily followed this occupation, and who bears no mark of accident. The constant presence of danger makes these men indifferent to the risks they run, and what would be considered a serious casualty in other occupations is often passed over among the miners as a "squeeze."

Much has been said, but little written, about the "bottom" coal of the Big Vein. As its name implies, it lies at the bottom of the seam, is about three feet thick, and is a coal of excellent quality for steam purposes. It is separated from the "breast" coal, by a stratum of slate about one inch in thickness. One foot below this there is a similar layer of slate.

Mr. Thomas Brown, Mine Inspector, in 1883, speaking of this "bottom" coal, wrote as follows:

"The practice now generally in use, in leaving from two to three feet of bottom coal, is a waste that cannot be justified upon any practical business principle. It is not only a dead loss to the capital invested, but to the community at large. The objection that, on account of the small strata of slate running through it, it cannot be kept clean, cannot be entertained for a moment by any practical miner, for it is a well-established fact that there are more slates in the veins of coal in Pennsylvania and West Virginia—the coal that mostly competes with us—than there is in this portion of our vein that is left unmined. If there were no bituminous coal mined but from veins without slate, the production would amount, seemingly, to nothing in comparison to what is at present mined."

It is gratifying to note that this and similar opinions have been confirmed by more recent and careful investigation, and that the old plan of abandoning this important source of supply has been greatly modified in modern practice. It has grown to be recognized as a mistaken policy to leave this three feet of coal unmined, and with one or two exceptions it is being taken out with the "breast" coal, and, seemingly, with good results.

As to its quality, Mr. John H. Parrott, superintendent of the American Coal Company's mines, had this "bottom" coal put to a severe and rigid test. This company owns a stationary engine, which is in operation at their "Totten," or Mine No. 5, which is used to haul long trips of loaded cars out of the mines. In making this test the fire boxes were thoroughly cleaned, and for one day nothing was used but pure "breast" coal. The following day breast and bottom

coal mixed were burned, and the third day pure bottom coal was used.

A careful record was kept of the amount of coal used, the number of trips hauled and the amount of steam generated. Each day the fire boxes were cleaned and the ashes examined, so that nothing escaped notice, and a thorough, practical test was given. The result is specially gratifying to those who have held in the past that bottom coal ought to be mined.

This test showed that for generating steam the pure "bottom" coal was superior, and the opinion of the men who did the work and watched the fires is, that "it is just as good" as the breast coal. The old time prejudice against the "bottom" coal is gradually giving way before the practical results of its use, and such tests as that reported must ultimately result in its more general production and consumption.

It is argued by some miners of many years' experience that, in certain mines in the regions, it would have been more profitable to their owners had they left bottom coal untouched, because they claim that before bottoms were lifted that most of the top coal, from two to three feet thickness, was secured, and that the lifting of the bottom coal makes it impossible to get as much of the top coal, which they claim to be better and clearer than that taken from the bottoms; however, the concensus of opinion among the mine owners, who have put this matter to a severe and technical test, is that they have profited by the lifting of this coal, and, consequently, bottom coal is excavated throughout the region generally, and wherever practicable.

The coal found in the small veins which under-lie the big seam of the George's Creek region is similar to that found in the Clearfield and Snow-Shoe regions of Pennsylvania, and as the products from those sections largely compete with the "breast" coal of George's Creek mines, there is no practical reason why the coal of these lower seams should not be mined, and an extensive sale found for it.

The time must come when the big seam will be exhausted, notwithstanding the present great supply. The facts are that we have a four-foot and a six-foot vein of coal. At the present rate of production these veins would prolong the mining industry for a long period of years. The average output for the last five years have been over four and one-half million tons.

The coal from these veins is said to be of excellent quality, though but comparatively little has been done towards developing these seams. Those mostly interested are looking to the

advantages to be obtained by a thorough system of coal mining; that is to say, by such a system as would preserve for use the entire yield of the coal fields, and bring it into the market; advantages, commercial and industrial, in money and in the employment, that will yet be afforded to a larger body of labor.

It is said that the great oyster supply of the Chesapeake bay has been greatly injured, that is, owing to crude and reckless methods adopted in the fisheries, that we are largely left with barren bottoms instead of oyster beds. A great and common out cry is made, and fears are entertained, that this great source of wealth and means of employment for labor is gradually slipping away from us. Surely, if this is the case, the experience of the eastern part of the State should be a lesson to the coal mining industries to husband carefully all their resources, so as to secure to all whatever success, and success means profit, that there may be in it. These questions are more important to the labor of this State than even the questions of hours of labor and wages, or of strikes and lock-outs. They are questions affecting the actual capacity of great bodies of men to work *at all*. Of course, the figures herein contained warrant us in supposing that this coal industry can and will be carried on for centuries to come, but the same might have been said of the natural supply of the oyster-beds some years ago. It is wisdom to use our natural resources economically, to carefully take advantage of our small as well as of our large opportunities, and not wait to lock the stable door till after the horse has been stolen.

The importance of our coal industries is an economic question that should be taken into careful consideration by all, in that it is a question that cannot be confined to any one special point, but must be looked at in its broadest sense as not being of importance to the miner alone, but that has a far-reaching influence over the welfare of our communities at large. It is not only the actual laborers at the mine—as the miners, the engineers, the carpenters, the blacksmiths and general laborers—but it also includes the vast multitude of men employed in machine and car shops, railroad hands, stevedores, sailors and the large number of men employed in the shipyards, sawmills and forests of the State and country, as well as those of various employments in the communities, who depend solely on the operation of the mines for their daily sustenance and common welfare.

This leads to the conclusion that a more united effort on the part of the employes in the various branches of industry,

toward a better and more careful development of our material resources, and an encouragement of industry by the advocacy of larger markets for the consumption of the products of their labor, would be productive of great practical good for them and to their families.

In 1854 experts in coal mining estimated that the three most important veins would furnish the following quantities:

Big vein, - - - -	266,200,000 tons.
Six-foot vein, - - -	580,800,000 "
Four-foot vein, - - -	363,000,000 "

Total, - - - - 1,210,000,000 "

This estimate was for the three veins alone. It has also been estimated by competent judges, that the available amount of coal in Maryland was 4,000,000,000 tons.

Between the years 1854 and 1897 there has been taken from this, George's Creek, region about 95,722,109 tons, and deducting this from the lowest estimate of 1854 it would show that there are yet about 1,114,277,891 tons to be mined from these three veins.

The average yearly output from the Maryland mines in the past five years has been about 4,601,003 tons. Should the present rate of mining continue, the three veins alone would not be exhausted in the next two hundred and forty years.

It is reasonable, though, to expect that the present yield will be largely increased, as extensive improvements and greater facilities for mining and transportation are constantly being made. According to the estimate made by the State Agricultural Chemist, in 1854, the big vein contained 354,933,333 tons of coal; deducting one-fourth for waste, this vein might be expected to yield 266,200,000 tons. The six-foot vein averaged 9,680 tons per acre, and could furnish 774,400,000 tons, and deducting the waste, would yield 580,800,000 tons of mercantile coal. The yield of the four-foot vein was 6,050 tons per acre, and the whole vein ought to produce 453,750,000 tons, of which 363,000,000 could be put on the market.

The George's creek coal is bituminous, has a glossy, jet-black appearance, and is of a superior quality, but is fryable, and often becomes pulverized in the course of transportation. For the generation of steam it stands practically unrivalled, certainly surpassed by none of the coal produced at present in any part of the world. It contains enough bitumen to make it readily inflammable, and it will not deaden the fire by each

addition to it. The proportion of carbon is such that it maintains a uniform heat for a long time. The following is the analysis of the George's Creek coal, made by Professor A. S. McCreath :

Water.....	1.23	1.11
Volatile matter.....	15.47	15.30
Fixed carbon.....	73.51	72.28
Sulphur.....	70	1.23
Ash.....	9.09	9.08

It will be observed that this article takes cognizance of only what is known as the "Cumberland" or "George's Creek" coal territory, though, as far as my knowledge goes, nothing has been written of or very little said about any other Maryland coal lands.

The western part of Garrett county has for years past been known for its prolific output of fine timber. But with its nearness and easy accessibility to the eastern markets, its days of profitable productiveness are about over. During the working of these timber lands it was generally understood, though not positively known, by those persons interested in the timber, that the lands were plentifully underlaid with coal. Though of such easy access to the timber, it was not so for coal purposes. Consequently, no special attention was paid to the question. But, since the disappearance of the timber, this matter has in the last year or two become quite prominent. We do not know of any well-directed efforts to find its area, the number or size of its veins, or the quality of the coal. But from the superficial examinations already made, it has been proven that coal underlies the largest portion, if not all, of that section of the county, extending in a solid body through West Virginia, and of its being connected with the veins of coal now being operated in that territory. From the information we have been able to obtain, we report the formation of a new mining company in Garrett county.

They have a valuable tract of land, underlaid with a good quality six-foot vein of coal, the same being situated on the line of the Confluence and Oakland Railroad. The opening to this deposit has been made near the village of Friendsville, Maryland. Coal has also been found near Grantsville, Garrett county. The "Beachy," a four-foot vein of coal, was struck at a depth of ninety-six feet, and at a depth of one hundred and thirty-six feet was struck a ten-foot vein of coal of the best quality. At a depth of two hundred and sixty-six feet a vein of seven to eight feet of coal was struck, and at

two hundred and seventy-six feet was through the coal and into the "floor" rock.

The Salisbury coal vein is more than three hundred feet above the "beachy" or four-foot vein. From what we have been able to learn, we think this may be a valuable vein of coal, but in order to have it operated, it would be necessary to extend the Salisbury Railroad branch about five miles. This could be done, as the grade is an easy one. Whether or not, this coal field will ever be operated, remains to be seen, but the opinion seems to be, that before another year has elapsed, steps may be taken to open this vein of coal. Recent reports say, that on the farm of Isaac Leighton on the Yonghiogheny river, six miles from Oakland, that an opening is producing a quality of coal almost equal to that of the George's Creek region. A vein of coal is said to have been discovered on the farm of Col. John E. Wood, three miles from Oakland, that is from seven to eleven feet in thickness, and is easy of access, while a vein producing a coal of an excellent quality has just been opened near Deer Park.

Oakland, it is believed, will eventually become the centre of a great mining district. Facilities for transportation are lacking, but it is very likely that railroads will be constructed to the principal veins.

From conversations had with several gentlemen connected with the Baltimore & Ohio Railroad, it seems to be the intention of that company to complete the Confluence & Oakland Railroad during the coming year. Twenty-two miles of this road have already been built, and is now in operation between Confluence on the Pittsburg division of the Baltimore and Ohio Railroad and Friendsville, Garrett county. The opinion seems to be that the coal found in the mountains along this railroad contains excellent coking qualities, as Mr. E. T. White, General Master Mechanic at Riverside shops, endorses the coke brought from off the main stem of the Baltimore and Ohio Railroad, as the best quality obtainable by them for fuel for their locomotives.

Doubtless with the opening up of this territory by the variously proposed lines of railroad, it will be rapidly developed. With its advantages of plenty of arable land, which in a few years it is possible to develop into a fine farming country, and the opening up of its coal, this territory will be able to support a large and increasing community of farmers and miners. We would therefore suggest to our State authorities, that we think it would be well if something

was done towards getting a somewhat better defined idea of the possible and probable extent of this, at present, new coal territory.

We know pretty well what the "George's Creek" region can do for the State, and think it quite as necessary that this or any other new development should have some attention paid to it.

There has also been considerable talk in the past two or three years about coal discoveries in the neighborhood of Cherry Run Station on the B. & O. R. R. It has even been stated that a large corporation has been formed to open up mines and develop the coal interests of that section. This is worthy of an investigation.

The coal mining industry of Maryland has mainly developed within the past sixty years. As far back as 1825 it was customary to float the coal down from Cumberland to Georgetown in flat-boats on the Potomac river. They were only capable of transporting 300 bushels of coal at the commencement of this system of navigation, but as the river became known and experience was gained, the size of the boats was increased to a capacity of 1,500 bushels. It was supposed in those early days, to quote a writer of that period, "that the time could not be very remote when this coal would be universally used from the mountains to the Atlantic." When we consider the enormous increase in its consumption which fifty years has witnessed, surely the suggestion respecting the waste and exhaustion of the supply is not unreasonable. Maryland coal is sought after for steam and smithing purposes, not alone "from the mountains to the Atlantic," but all over the United States, and finds as ready a sale in San Francisco as it does in all the Atlantic States.

In 1828 the Maryland Mining Company was incorporated, and ten years later a charter was granted to the Maryland and New York Mining Company, and then the first organized effort to work the coal fields commenced. These corporations finally combined under the name of the "Consolidation Coal Company" in 1860. Prior and up to 1842, men engaged in various pursuits during the summer months, would engage in coal mining in the winter. The principal mine of those days was the celebrated "Eckhart" mine, from which coal was hauled to Cumberland, nine miles, in wagons, and unloaded on the banks of the Potomac river. The boats loaded with this coal were carried down by the spring freshets.

In November, 1842, the Baltimore and Ohio Railroad was completed to Cumberland, and shipments were made over it, amounting to 1,872,709 tons from that year to 1854, inclusive. The Chesapeake and Ohio Canal, from Georgetown to Cumberland, was completed in the year 1850, and the same year 4,042 tons were shipped by that route. The Pennsylvania State Line Branch, connecting the Cumberland and Pennsylvania Branch Lines of the Pennsylvania Railroad, began carrying this coal in 1872, and the George's Creek and Cumberland Railroad in 1881. The latter line carries the coal from the mines at Lonaconing, comprising the American, Maryland and New Central Companies, and a part of the output of the George's Creek Coal and Iron Company. Previous to its completion, the Cumberland and Pennsylvania and its Eckhart Branch, enjoyed a monopoly of the trade from the mining regions to Cumberland. The Cumberland and Pennsylvania Railroad Company was chartered in 1850, and purchased from Mount Savage to Cumberland, a distance of ten miles. In 1854 this road was extended to Frostburg, and in 1859 tracks were laid to Lonaconing. The George's Creek Coal and Iron Company built a railroad from Lonaconing to Piedmont in 1852, and this was bought by the Cumberland and Pennsylvania Railroad Company in 1863, thus giving them a line running directly through the heart of the coal fields of the State, and extending from Cumberland to Piedmont, W. Va., a distance of thirty-four miles.

The Eckhart Branch of this road was built in 1846 by the Maryland Mining Company, and was sold to the Cumberland Coal and Iron Company in 1852. The distance from Piedmont to Baltimore, via the Baltimore and Ohio Railroad, is 206 miles; from Cumberland to Baltimore by same line is 178 miles; from Cumberland to Georgetown, via Chesapeake and Ohio Canal, 184 miles, and from the State line to Amboy, 365 miles. Shipments made from the mines from 1842 to 1897, inclusive, compiled from official sources, are 98,060,562 tons, and it will be observed that the yield of the coal regions has increased from 1,708 tons in 1842 to the enormous amount of 5,303,485 tons in 1897.

No greater comment is necessary on the rapidity with which we are using up the yield of the Big Vein of George's Creek coal.

The coal operators experienced some difficulty in securing cars for the transportation of coal after the great flood of 1889, which almost destroyed the Chesapeake and Ohio Canal.

For over two years navigation on this artificial water-way was stopped. After strenuous efforts and the outlay of a large amount of money, it was finally repaired, and on August 23, 1891, the first boat of any description that had arrived in two years came into Cumberland. This was the pay boat, which had been about five days making the trip from Georgetown, and which was gladly received by the workmen along the line. The people resident along the borders of the canal, and those accustomed to do business in Cumberland, in connection with it, in the shipment of coal, etc., cannot be persuaded that the days of its usefulness as a method of transportation are passed. They are convinced that while it may never recover its former prestige, that hundreds of thousands of tons of Maryland coal will yet find an outlet to the seaboard by its means.

Perhaps, in their case the wish may be father to the thought, but the wish is reasonable. It has, for many years, been the source to which hundreds of industrious men looked for employment. It has built up industries, which, but for it must languish and die. It created a class of men who lived on its waters and traveled its tow-path, with all their worldly wealth invested in their stock and the boat, which was their home and their fortune. The wrecks of these boats were strewn along the banks of the canal; the mules were sold for the necessities of life; men dependent on this employment wandered out seeking a living, and too often confronted by want bordering on starvation, thus causing a majority of those employed to leave the path forever. It is, therefore, no wonder that the few who remained hailed with joy the resumption of work, and refuse to believe that the times will ever come when the bluster and push of the steam cars that pound along day and night by the side of the sleeping old canal, will ever make it impossible to profitably carry coal over its waters. Since this disastrous flood, of which there has been no repetition, things to some extent resumed their normal condition. But it seems that this will last only for a time, and like everything else, the old canal, must give way to the inevitable march of modern progress.

The most difficult task attempted is to secure information in regard to the cost of production. It is greatly to be desired to secure the cost of production at the various mines, and the average for the entire region, but this seems futile. It is certain that the cost varies according to circumstances, but the nearest facts arrived at, make it run from nine to fifteen

cents per ton, and from all the data possible to obtain, the average cost of production may be placed at thirteen cents per ton. Added to the present rate of mining (45 cents per ton), the actual cost per ton, on board cars, would, therefore, be about fifty-eight cents per ton of 2,240 pounds. This calculation is for the run of the mine. For many reasons, principally because of the location of the coal seams, and the facilities for shipping the coal at the mines, the cost of production in Maryland is less than in a majority of the mines in other regions.

Since 1896, the price paid for mining coal in the George's Creek region has been forty cents per ton. The companies charge the miners one cent per ton for smithing, such as sharpening tools, etc. The wages of the other employes average as follows :

Drivers	-	-	-	-	\$1.73 per day.
Laborers	-	-	-	-	1.50 per day.
Carpenters	-	-	-	-	2.05 per day.
Blacksmiths	-	-	-	-	2.05 per day.

Engineers average \$60 per month. Roadmen, or track layers, average \$2.05 per day.

It is gratifying to be able to report that improvements in the method of production are being made throughout the region. Within the past few years, coal operators have seemed to realize that to husband their valuable property and obtain a greater return on invested capital, it is necessary to improve on old and crude methods, and this more especially with reference to the manner of bringing the coal to the surface and of ventilating the mines. Such improvements have been very extensive and permanent in a majority of the mines throughout the region. Artificial ventilation is taking the place of the natural in old and new workings. Old workings are the more difficult to ventilate, and in them "black damp" is, as a consequence, principally found. New workings are so planned and operated that "black damp" is almost unknown. Bringing coal to the surface is being greatly facilitated by improved and expensive machinery, which is rapidly supplanting the labor of horses and increasing the capacity of the mines. It is not necessary to enter into any lengthy description of these improvements.

It is to be hoped that as broader views are cultivated respecting this work, and more scientific methods adopted for its prosecution, the average of accidents may sensibly decrease in the coal fields, and the safety of human life and

limb be made more certain to the hard working and brave men, who pursue a miners' calling for a livelihood. The coal seams now being worked in Maryland are entirely free from explosive gases, hence we are spared the necessity of recording the horrible disasters which occur from explosions.

The principal cause of accident and death in the coal mines of this State is the peculiar formation of the fourteen-foot vein. The coal is divided in blocks by what are technically known as "slips," that is, cracks in the substance of the coal. These "slips" run on an angle of about forty-five degrees, make a distinct parting in the coal, and extend from the "bottom" coal up through the "breast" and "top" coal to the slate above. They run in every conceivable direction, and render the use of powder or other explosives in mining totally impracticable. The work of mining the coal, therefore, is one of sheer manual labor with pick and shovel.

The face of the coal vein in the mine exactly resembles the blank wall of a room. The operation of mining a "breast" of coal is, first to "undermine" it to a depth of from two to five feet, varying according to the solidity of the coal; if yielding, or likely to be so when "trimmed up," the careful miner will "undermine" it about two feet and do the work in a standing position, so as to afford him a reasonable chance of escape should the coal suddenly give way. Should the coal prove solid and firm, it is "undermined" to a depth of from three to five feet. This is done first in a standing position, and when the miner cannot reach under the coal any further, he lies down and completes the work. In this manner the coal is "undermined" to a sufficient depth without producing much "slack" coal. The next process in the operation is "cutting" or "shearing" the coal, that is cutting on each side of the "room" or entry, to a depth equal to the "undermining."

The miner works first on his knees to accomplish this part of the work, and completes it in a standing position. While thus engaged the accumulating "slack" coal affords him some protection from accident from a sudden fall of the coal. The "cutting" or "shearing" is from twelve to eighteen inches wide at the "face" of the coal, and narrows down to a few inches at the back. It extends from the bottom of the "room" to the top, and thus with the undermining leaves the "breast" ready to "take down." The "taking down" process is commenced by "scutching" or "squaring" the coal. All the rough corners and small portions of "slips" on the "face"

are removed, and when the "scutching" is well done, it leaves the "breast" divided in huge masses, and with all the "slips" exposed. Then, with one or two wedges, properly placed and carefully driven, the coal is brought down in large lumps, often weighing from one to three thousand pounds. It is while this class of work is being done that the greater number of accidents occur. A miner may be deceived by the "sound" of the coal, and be crushed while lying down undermining.

Again, the "sound" of the "top coal" may induce him to postpone setting a prop under the dangerous roof, which suddenly falls and maims or kills him. Indeed, this "top coal" is particularly dangerous, and has been the cause of the death of many unfortunate miners. Of course, many accidents may properly be attributed to the carelessness of the workman, while many are absolutely unavoidable, and result in the injury or death of the most careful and pains-taking miner.

It is impossible for State legislation or mine regulations to obviate this class of accidents; and when we consider the exceedingly dangerous character of the occupation, perhaps the proportion of fatalities is comparatively small. It certainly reflects credit on the skill and intelligence of the men employed, that more misfortunes are not recorded in the history of our mining regions. For it is a well known fact that accidents often causing permanent injury or death average much less for the George's Creek region than for any other region.

The relations of capital to labor have been pleasantly maintained during the past three years. We believe that the folly of strikes and lock-outs have been so forcibly impressed upon both miners and operators during the various long and bitter struggles in the past, that it is probable no such disastrous methods will again be adopted, until all other means of adjusting such difficulties shall have been tried and found to absolutely fail.

The periods of strikes and lock-outs are the black spots in the history of labor in the coal regions—times to be remembered with bitter memories, and to be recounted with sorrow and regret. Then, indeed, the land was desolate, and hunger and poverty stalked abroad in the land, breeding deadly passions of hatred and revenge. How often, in the quiet evening, when the lights of the miners' lamps flickering among the trees on the mountain sides, warn the housewife

that the labor of the day is ended and the toilers are returning to their evening meal, has the story of those dreadful days been told by quiet women, in tones hushed by a realization of their suffering and horror.

These are times when experience is dearly bought, and stubbornness sold at a high premium. Let us say, in memory of those times, that both sides were at fault, and hope that there may never again, in the history of our State, be a necessity for their recurrence. For several years there has been peace between employer and employe throughout the coal fields of the George's Creek region.

The "ventilation" law, as it is popularly termed, enacted in 1878, chapter 157, provided for the weighing of the coal at the mines by a weighmaster, who, before entering on his duties, qualifies before a Justice of the Peace in the following form:

STATE OF MARYLAND, }
ALLEGANY COUNTY, } *to-wit:*

I hereby certify, that on this — day of —, 189—, before the subscriber, a Justice of the Peace in and for the county and State aforesaid, personally appeared — —, weighmaster at the —, one of the mines of the —, near —, in Allegany county, and made oath on the Holy Evangely of Almighty God, that he will perform the duties of weighmaster at said mine with honesty and fidelity, and will keep a true account of all coal so weighed by him or under his direction, and will credit and allow the full weight of coal in each mining car to the party or parties who mined the same, at the rate of 2,240 pounds per ton.

Sworn before me,

— — — — —, *J. P.*

Since the passage of this law there have not been as many complaints, and few of an important character. Upon receipt of such complaint it is the duty of the Mine Inspector to examine and test the scales and see that they are correct. Prior to the enactment of this Statute, the miners were credited with two tons for each car sent out, which would constantly be in excess of the weight. Now the miners are paid for all the coal sent out of the mine, and consequently there is not as much cause for complaint under this head.

The miners in the George's Creek region are a superior class of men. They are made up of Scotch, English, Irish,

Welsh and German nationalities and their descendants. During the strike of 1882 some Hungarians, etc., were brought into the county to take the place of the strikers, but few remained; those who did have identified themselves with their social surroundings.

As a body, the miners are very intelligent and industrious, some of the leading men of today in our State and in others, having come from the mining regions of Maryland, and were in a great many cases miners themselves, the others being sons of miners. The nature of their occupation and the hard times through which they have passed in the prosecution of their industry, makes them clannish and argumentative, but the majority are men of sterling character; good parents and good citizens.

They support a number of beneficial orders and religious establishments. They are, as a rule, a reading people, many of them having accumulated good private libraries.

There are two daily and nine weekly papers published in Allegany, and three weekly papers published in Garrett county. The miners very much desire to see the advancement of their children, and to see that they have advantages which many of their parents had neither time nor opportunity to acquire; and in this respect the region of George's Creek differs from some other coal fields. Therefore, domestic and educational advantages are much sought after. Superior opportunities for acquiring a sound common school education are at hand, though the half-grown men cannot attend school as easily as they did in the days when shipments were made almost entirely by canal. The work was often entirely suspended during the winter months, owing to the freezing up of the water, and the boys all attended school, though at the present day in most school districts, arrangements are made for holding night schools during the winter months, and those opportunities seem to be largely accepted. Large families are the rule in the mining districts, six children to a household being the average. The children are early initiated into the duties and responsibilities of life, both domestic and industrial.

In the thriving towns throughout the mining region, many of the houses are owned by the miners, and this prevents a migratory unsettled class of labor, common to some other districts. Men are loathe to leave their small homesteads, and many miners who were induced to move West a few years ago, have returned, and express themselves as better satisfied

with the work in the George's Creek region than what they have found elsewhere.

The miners are generally healthy, and attain a good age. "Miners' Asthma," caused by working in impure air, is prevalent to some extent among the older men, but it is hoped that by the introduction of improved methods of ventilation, under the provisions of Maryland laws, the younger generation may be exempted from the ills of this nature, from which their fathers have suffered.

While miners and their families receive medical attendance under a provision of the law which authorizes the employer to deduct the fees of the physician from the earnings of the men, yet they are not of necessity bound by this law. Even under its operation, they have the privilege of choosing their own physician, and if they see fit, can be entirely independent of it. Most young men over twenty-one years of age pay, in this respect, the same fee as heads of families. The service is highly spoken of in the region as skillful and reliable.

It is a mistaken idea that the miners of this region are a rough, uncouth or lawless class. Their social condition compares favorably with that of any other part of the State. The men located in Maryland from twenty to forty years ago, and here they have made their home, steadily and industriously pursuing their chosen calling. Although composed of several different nationalities, under our remarkable and elastic system of government they have assimilated with our people in habit and customs, until today the race lines are almost obliterated in the common bond of American citizenship.

Our experience has been that these men, who in the western mountains have by their labor added so greatly to the wealth of this community, are an intelligent, sympathetic and fearless class. Boys are permitted to enter the mines as "half-turns" when fourteen years of age. A few years ago they were taken in at ten, eleven or twelve years of age. This increase in the limit of age is an excellent rule. When boys are taken into the mines at such an early age they lose all chances for obtaining an education, and are thus compelled to pursue the calling of a coal miner all their life, as but very few of them ever endeavor to obtain any other kind of employment.

The cost of living has been greatly reduced during the past twenty years. Taking everything into consideration, it is probably fifty per cent. cheaper than in 1870.

When we consider that men mined more coal to the ton prior to 1878 than they do now—that is, that they mined *all*

that was necessary to insure a car being counted at the opening of the mine as two tons of coal; that the facilities are better than they were in the past, and in proportion the opportunities for labor more certain; that the prices of the necessities of life are now nearly one-half less in cost at retail than they were in 1870. It is reasonable to conclude that the condition of the coal miner is better today on the receipt of forty-five cents per ton for every ton of coal he digs, than it was when the price was sixty-five cents per ton for every car allowed as two tons.

And, while we recognize the fact that it is the development of the country and the large home supply which has reduced the majority of these articles of food, it is also the wise legislation of the State, urged and contended for in the years past by these very workers in the coal industry, which has materially tended to keep up the price of wages and guaranteed a fair return for their labor to the industrious coal miners.

Timber is now delivered to the miners at the face of the workings, as provided for in the Acts of 1878, chapter 157. It is an improvement on the old method of working, very acceptable to the men.

Every effort is also made to avoid overcrowding in the mines and to give every miner a fair share of the work to be done, thus affording an opportunity to all to make equal time and wages. Of course there are, necessarily, some exceptions to this rule. The hours of labor are, by the provisions of the Statute of 1884, chapter 427, restricted to ten hours per day, to commence from 7 o'clock A. M., but with the right of the employe to contract specially for overtime. The hour for going to work varies according to the rule of each company. Thus, some miners start at 6 o'clock A. M. and some at 6.30 A. M., and quitting from 4 to 5 P. M., except when the company may be pushed for coal to fill orders; then they "get in" an extra quarter of a day.

There is also sometimes a "night shift," when the men go to work as the day turn quits. Sometimes, in extra cases, the mine is put on "three-shift" time, when each "shift" of miners works eight hours, arranged according to the circumstances best suiting the working of the mine. But it must be understood that these variations from the law are with the full consent of the employes.

In some cases, discontent has been reported, the men complaining about the irregularity of the hours. Sometimes

on account of "short time," caused by the company being short of orders, cars or some other unforeseen circumstance, the miners have been called out to work at 9 o'clock A. M., with only a few hours work. Again, when they have been kept at work an hour or two over the usual time, and told there would be no work the next day, but were called in again at 9 A. M., often to find "no work." But with the advance of modern conveniences, such as telephones, etc., these troubles have been obviated to a great extent. The companies, as a rule, being generally able to let the men know over night by means of blackboards posted at some prominent place, or as the George's Creek Coal and Iron Company does, by the means of "blows" from a very large whistle, blowing loud enough to be heard all around, whether there is "work" or "no work," and if work, then the hour of starting.

It is not reasonable to suppose, however, that in a large district, employing a great body of labor engaged in an industry, the demand for the product of which is so variable, that some such irregularities would not occur. Even experience and foresight will not always prevent them, and I am satisfied that the general good sense of the labor employed in this industry causes them to be regarded as exceptions and not the rule.

It has been customary in years past to pay wages for work done by the miners on or about the fifteenth day of each month, for work done during the month previous. This had for some years caused a great deal of dissatisfaction, the miners thinking that in justice they should be paid more frequently. During the election held two years ago this was made one of the leading questions, the result being that an Act was passed by the Legislature, during a session held two years ago, giving the miners semi-monthly pays. The men are, therefore, paid on the tenth of the month for work done up to the previous pay day, and again on the twenty-fifth for work done up to the tenth of the month. And it must be said that these pay days are met promptly, there having been but few variations made by causes unavoidable. The full amount is paid in cash, deductions only being made for the items before mentioned in this article.

This arrangement seems to give universal satisfaction. It gives money a more free circulation, it enables the men to pay cash for their goods, thus being able to buy at lower figures, and it does away to a large extent with the disastrous

credit system, disastrous alike to both merchant and miner, and helps the merchant to keep his business in better shape.

Some years ago a number of corporations engaged in mining operations, conducted a general merchandising business, which was largely, if not wholly, supported by their employes. At the end of each month the amount of each man's purchases was deducted from his pay. This is termed the "pluck-me system." These stores, where conducted, were carried to such extremes as to create widespread dissatisfaction, and public clamor was made against their continuance, evidencing that unpleasant relations would exist between employer and employe unless these "pluck-me" stores were abolished.

Most of the companies gradually rid their stores of their stock and for many years it was generally supposed that no such a thing as a company store was conducted in any part of the mining region, but for the past few years several stores in certain sections of the region have been so classed, and whether true or not, it is well known that efforts have been made very recently to enact laws restrictive and sweeping in their provisions purposed to prohibit, absolutely, company stores or any store in which any officer or stockholder of any coal company is interested.

George's Creek in general is certainly to be congratulated on the present condition of affairs, especially when compared with the affliction and hardship thrust on other coal regions by this pernicious system, and of the futile efforts of the miners to rid themselves of this public pest.

We believe that the day is not far distant when even the few stores now looked upon as company stores by the miners of the region will cease to exist, for public sentiment among all classes of people in and about the coal region is emphatic in opposition to them, believing, as they do, that the miner should expend his hard-earned money where he feels disposed.

A very interesting and instructive article on the coal mines in and about Frostburg was published in the *Coal Trade Journal* some time since, and as it contains some very valuable facts relating to the past and present history of the mines operated by the Consolidation Coal Company, the largest company in the region, we deem it of sufficient importance to re-publish the same, in addition to facts already stated:

"In the neighborhood of this long-settled town, are some of the best of the many excellent mines of the George's Creek

Cumberland coal district. The city of Cumberland, from which the coal produced in this mining district derives its distinctive trade name, is an important point on the Baltimore and Ohio Railroad, 178 miles west of Baltimore. Frostburg is seventeen miles west, and the chief means of transportation is the Cumberland and Pennsylvania Railroad, which is owned by the Consolidation Coal Company. It extends from Cumberland, Maryland, to Piedmont, West Virginia, passing through Frostburg, Maryland, about midway of its length.

"About four miles west of Cumberland, the line of the Baltimore and Ohio which runs to Pittsburg, diverges, the traffic of that line between Cumberland and Mt. Savage Junction passing over the Pennsylvania Railroad. Two miles further west is the junction with the Pennsylvania State Line Road, a branch of the Pennsylvania system, which extends to Mt. Dallas, from whence the traffic goes over the Huntingdon and Broad Top on the main line of the Pennsylvania. The iron-hopper coal cars to be seen along the line of the road are used, it may be mentioned, entirely in the canal trade, carrying coal to the Chesapeake and Ohio Canal at Cumberland, from whence shipments are made to Georgetown, D. C., and intervening points. The canal is controlled by the Baltimore & Ohio Railroad Company, and is supplied with a tonnage of about 1,000 tons per day. The small loads, 6-18 tons, carried by the iron cars, especially fit them for this sort of business, as they do not dump too much coal in the boats at once, and so endanger them, and then, too, the boats can be filled more exactly by using the small cars. It is interesting to note that not many years ago these cars were considered the *ne plus ultra* of coal transportation. Now, no more are built, and all new cars are of wood and of thirty tons capacity. To secure this great capacity in soft coal, it is necessary to have the sides almost as high as those of a box car.

"The first mine passed, *en route* to Frostburg, is the No. 2 Union mine, of the Black, Sheridan and Wilson Company. All of the mines of this company are called Union, and designated further by a number, and those of the Consolidation Coal Company are in similar style called Ocean 1, 2, 3, 4, 5, 6, 7, although they also retain old local names. Near Union No. 2, is the site of the old Allegany mine. Ocean No. 5, opened in 1844, the first in the district, and recently abandoned.

"As the elevation of Frostburg is 1,700 feet greater than that of Cumberland, heavy grades are encountered throughout the distance, the ascent is 176 feet to the mile at one

point near Mt. Savage, and just beyond, the country becomes so rugged that a switchback up a ninety-foot grade is resorted to for passenger trains and a circuitous route with almost equally heavy grades is used by freight trains.

"At Frostburg the railroad passes by means of a tunnel through the divide separating Jennings's Run from George's Creek, and enters the George's Creek district proper. A little beyond the town may be seen the main pumping station of the Consolidation Coal Company, having a capacity of 2,800 gallons per minute; at another location the company has a plant with a capacity of 800 gallons per minute, making a total capacity of 3,600 gallons per minute. Just now there is no trouble from abundance of water, quite the reverse, everything is very dry, and it is difficult to get sufficient water for the locomotives. To overcome this, artesian wells are now being completed, and no further recurrence of the trouble is anticipated. Further along on the opposite side of the road are the substantial works of the abandoned Borden Shaft. There are massive brick buildings, and a tall brick chimney, which resemble a mill plant rather than a coal mine.

"The first mine of the Consolidation Coal Company to be reached, is Ocean No. 1, located at the village of Ocean. An area of three to four hundred acres is embraced in the workings of this mine. The surface buildings include a large and particularly well-built barn, where a good part of the company's 120 mules are kept, engine house, carpenter shop, etc. A new boiler-house is being erected, and a complete compressed air-plant is to be installed, the purpose being to place pumps underground and convey the air-power to them by piping. At this mine, as at all others of the company, the cars are hauled out of the main gangway by a rope haulage system, the length of that in use here being 6,000 feet. Included in the apparatus here is an electric lighting plant, all the mines being thus equipped.

"About two miles away, in a direct line, is the large new operation known as Ocean No. 7, and between the two a connecting tunnel, through coal all the way, will be started this fall.

"Ocean 7 will be one of the finest soft coal mines in the country. Its site was a virgin forest this spring, but it is now getting into shape for business. The main opening is a drift which is reached through an archway 17 feet and 6 inches in width, and 13 feet and six inches in height. The face of the

arch is cut stone, and back of that is stonework and brickwork for a distance of 250 feet, which suffices to carry operations well into the hillside and into good solid coal. The seam is ten feet in thickness, but not all is taken out, because the slate above would not form so good a roof as the coal, and it is more economical to let one foot of coal stay in, rather than use an excessive number of very long props. Three headings are now being driven here, each by three shifts of three miners each, so that work goes on day and night, and good progress is made. Very soon other headings will be turned off and many more men put at work.

"A few rods to the right of the main opening is an auxiliary opening, the works of which will connect with those of the main opening as developments progress, the purpose being to aid ventilation. Two headings are being driven from this opening with three eight-hour shifts. As the men in headings average about four tons per day, the total output is now in the neighborhood of 180 tons per day, simply from this preliminary work. When all is in full working order, this will be the largest mine in the entire district, and with but one or two rivals in the United States, for it is anticipated that the daily output will be 7,000 tons. Already coal has been dumped over the tippie at the rate of 10,000 tons per day, and it is thought that there will not be the least difficulty in handling outside the entire product of the mine, as all arrangements have been made with that end in view. The coal when loaded into railroad cars goes out over a short branch to the main line of the Chesapeake and Potomac.

"This most important operation of the company was laid out by its mining superintendent, Mr. B. S. Randolph, who is in general charge of all the company's operations in the region, and is in immediate charge of Foreman Somerville, who has been with the company in such capacity for fifteen years. With one or two unimportant exceptions, this is the first new mine opened in the district for twenty years.

"A town has been laid out at this point, which is to be called Lordolph, and a street is being graded and houses built. These houses are built simply as a convenience to miners who may wish to live in them and not as a source of profit, nor is any one compelled to live in them. Houses which cost \$500 are rented at \$4 per month, which is surely little enough, if any regard be paid to interest and depreciation.

"This is one of the very few mining districts where any number of miners own their homes, and here it is quite the

general thing. Many of the houses are built on five-year leaseholds from the company, the understanding being that the lease will be renewed unless the land is required for mining purposes, in which event improvements will be paid for. Others have built on private property some distance away from the mines, and the men go to and from their work on horseback or in little road carts. It is surprising to see the number of very presentable horses which are thus employed. The expense of keeping the horses is, of course, far below the city standard, such an important charge of shoeing, for instance, being paid for with a bushel of potatoes from the home garden patch.

"En route from No. 7 to Frostburg by the highway one passes the old Bowery mine of the Borden Mining Company which is adjacent to the site of the still older Bowery furnace, which was long since dismantled and removed, only the foundation of the chimney remaining, in addition to the large slag pile, to mark the spot. At this mine there are a lot of small stables built by the miners to hold their horses. Some appear to fit the horse as closely as a blanket, but others are a fair size. The carts and harness are left about on the grass without any fear of loss, apparently.

"The Cumberland miners are much better off in a social way than those in any other district, the most casual observer of their houses, their children, their gardens and live stock, can see that at a glance. This is not without its importance to the coal trade, for one of the reasons why manufacturers sometimes hesitate to contract for soft coal is because of a fear of strikes cutting off their supply. Apparently from now on there will be little to fear from this source, for the men undoubtedly now recognize their advantages. The strikes here were in 1882, 1886 and 1894, and were largely caused by the formerly powerful Knights of Labor. The leaders finally became too arbitrary, and after the '82 strike they lost much of their influence. That strike was caused by a reduction in the rate for mining from 60 cents to 50 cents; in '84 the rate was reduced to 40 cents, and the next strike was for a restoration, the advance to 50 cents was made in '87 and the result of the '94 strike was the acceptance of a 40-cent rate. In '95 a voluntary advance to 45 cents was made, and that rate still continues.

"It is interesting to note that upon either side of Frostburg may be seen traces of the old road laid out across the mountains prior to 1755, and improved by General Braddock in

that year, with much labor and delay, in order to move his ponderous baggage train to Fort Duquesne, which he was destined never to reach. The main street in Frostburg is part of the National road built from Washington to Wheeling about 1825, and still in good condition in some places. From Cumberland to Frostburg it is in splendid condition and is very much used.

"Passing out of Frostburg to the eastward on the National road, as one reaches the outskirts, the property of the Consolidation Coal Company is again reached, and a fine private road gives access, across a splendid farm, to the well-known Hoffman mine. The scenery in this vicinity is very pleasing. There is none of the desolation such as is to be seen in the Schuylkill, Lehigh and Pittsburg districts, but the surface seems to be as fertile as any the sun shines upon; cultivated fields, meadows and woods alternate and form a most pleasant prospect. At one place I was told: 'We own as far as you can see in that direction, about six or seven miles,' and it surely looked very unlike the typical coal property.

"Hoffman mine has been working for half a century, turning out about a half million tons per annum, so that it can readily be imagined that a great excavation has been made here. A rope haulage over 3,000 feet long is used here. Hoffman is in charge of Foreman Thomas, who started in the coal business at the early age of ten, at one of the mines in this district, and after trying life in Illinois and Pennsylvania decided that the Cumberland district was the best place for a miner, and here he has been engaged for upward of forty years.

"A mile and a half from Hoffman is Eckhart, the second oldest mine belonging to the Consolidation Coal Company. This plant is under the direction of Foreman Daniel Krapf. This village was the scene of a very stubborn contest in the strike of 1882, and it became necessary to erect a stockade and barracks for miners and police before operations could be resumed. A large carpenter shop is the special feature at this mine.

"From this point the Eckhart branch of the Cumberland and Pennsylvania Railroad becomes a gravity road, and it is not used for regular passenger traffic. An occasional car is run and the twelve-mile trip is a very pleasant ride.

"The Consolidation Coal Company owns the C. & P. Railroad, of which Mr. L. M. Hamilton is the general superintendent. Although the Consolidation Coal Company is a very

old one, it would be a great mistake to suppose that it is an "old foggy." On the contrary, it is the most active factor in the entire field, the management of President C. K. Lord having already caused it to make rapid progress. This company is now by far the largest operator in the field, and with its improved facilities will become still more important, and, speaking of tonnage, we must not overlook the Black, Sheridan, Wilson Company, which also ships over the B. & O. Railroad, and has the second largest tonnage and some of the best property in the district."

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Laws of Maryland Relating to Coal Mining in Garrett and Allegany Counties.

MINE INSPECTOR.

196. The Governor, by and with the advice and consent of the Senate, shall appoint one Mine Inspector for the counties of Allegany and Garrett, who shall hold his office for two years from the date of his appointment.

197. No person shall be eligible to the office of Mine Inspector until he shall have attained the age of thirty-five years, and shall possess a competent knowledge of all the different systems of mining and working and properly ventilating coal mines, and the nature and constituent parts of noxious gases of mines, and of the various ways of expelling the same from said mines.

198. Before entering upon and discharging the duties of his office, said Inspector of Mines shall take an oath to faithfully discharge the same in an impartial manner; and for the faithful performance thereof he shall receive a salary of fifteen hundred dollars per annum, which said salary shall be paid out of the State's money by a warrant of the Comptroller upon the State Treasurer for the same.

199. It shall be the duty of the said Mine Inspector to carefully examine all mines that may be in operation in the counties of Allegany and Garrett at least once in every month, and oftener if necessary, to see that every precaution is taken to insure safety to all workmen that may be engaged in said mines, and to see that the provisions of sections 201, 202, 203, 204, 205, 206, 207 and 209, are strictly observed; and it shall further be the duty of the said inspector, after being notified by a justice of the peace or coroner of either of said counties of Allegany or Garrett, to attend at every inquest that may be held on the body of every person that may lose his life while engaged at work in or about any of the coal mines of said counties, and he shall examine closely into the cause by which said person lost his life; and if it shall be fully proven that the said person lost his life by any wilful violation of any of said sections or any wilful failure to comply with any of their provisions, the widow or lineal heirs of

the person whose life shall be so lost, may institute a suit against the owner, lessee or operator of said mine wherein the accident took place, and may recover such damages as the Courts may determine for the loss she or they have sustained by the death of the person whose life has been lost while engaged at work in said mines.

200. The said Mine Inspector, while in office, shall not act as land agent, or as agent or superintendent and manager of any mine, and shall in no manner whatever be under the employ of any of the mining companies operating mines in said counties; and it shall be the duty of said Mine Inspector on or before the first day of January in every year, to make a report to the Governor, of his proceedings as such Mine Inspector and the condition of each and every mine in said counties, stating therein all accidents that may have happened in or about the said mines, and to set forth in said reports all such information that may be proper and beneficial, and also to make such suggestions as he may deem important as to any further legislation on the subject of mining.

201. The owner or lessee of every coal mine that may be in operation in the said counties of Allegany and Garrett shall make or cause to be made an accurate map or plan of the workings of such mine, which shall be kept at the office of the company, lessee or individual so mining, and shall be at all times accessible to the said Inspector for reference only.

202. The owner, lessee or agent of every coal mine that may now or hereafter be in operation in the said counties of Allegany or Garrett, whether worked by slope, shaft or draft, shall provide or establish for every such mine a proper system of pure-air ventilation by such modes as are now in use in the coal mines of Allegany and Garrett counties, which said ventilation shall be maintained through every working heading throughout the entire mine, so as to expel from said mines the noxious gases and impure air and thus keep the entire mine in a healthful condition for the men working therein, and free from danger to their lives from such impure air and gases.

203. To secure the proper ventilation of every coal mine in the counties of Allegany and Garrett, and to provide for the health and safety of the men employed therein, the owner, lessee or agent of each mine shall employ a competent and practical inside overseer, whose duty it shall be to keep a careful watch over all the ventilating apparatus that may be

placed in said mine, as well as all the air-ways, all the traveling-ways and all the timberings, and to see that all loose coal and rocks overhead are carefully secured against falling upon any of the miners engaged at work therein as they advance in their excavations; and it shall be the duty of the inside overseer so employed to take charge of and keep a careful watch over all things connected with and appertaining to the safety of the men at work in the mine, and to report to the owner, lessee or agent of said mine when and where anything under his charge is unfit for mining purposes; and it shall also be the duty of the inside overseer so employed to take charge of and pay strict attention to all the air-doors used in the ventilation of said mines, and all air-doors used in the ventilation of said mines shall be suspended in such a manner that they will close of their own accord.

204. The owner, lessee or agent of every mine in operation in said counties of Alleghany and Garrett shall furnish at his own expense all props and all the requisite timber that may be used in the working of said mines; and as the miners employed at work therein proceed with the working of their excavations, it shall be the duty of the owner, lessee or agent of said mines to furnish a sufficient quantity of timber at the place where the miners are at work; and whenever the said workmen engaged in the said excavation shall deem it safe and proper to have any of the props or timbers removed from said excavations, it shall be the duty of the person so employed by the owner, lessee or agent, to remove the said props and timbers to whatever point or place the workmen engaged therein may require, but no props or timber whatever shall be removed when such removal may endanger the lives of any of the workmen engaged therein.

205. Whenever any impure air or gases are known to exist in any of the mines in the said counties of Alleghany and Garrett, which are likely to endanger the lives of the miners employed therein, it shall be the duty of the Mine Inspector, upon the same being made known to him, to proceed at once to make a careful examination of the ventilating apparatus of the said mine, and if he shall find that the gases and impure air existing in the said mine are occasioned by the bad condition of the ventilating apparatus connected therewith, he shall immediately notify the owner, lessee or agent to expel from the said mine all noxious gases and impure air existing therein, and to properly ventilate the same.

206. The Mine Inspector shall also be inspector of weights at all the mines now or hereafter operated in said Alleghany

and Garrett counties, and shall have power to weigh the coal mined therein, from time to time, on the scales at the different mines in said counties, and to test the accuracy of such scales, and to do any other act that he may deem necessary to ascertain whether or not the miners are allowed full weight of coal in the mining cars, when placed upon the scales of the different mines; and it shall be the duty of every person acting as weighmaster, for the owner, lessee or agent of any of said mines, before entering upon the performance of his duties as said weighmaster, or before making any report as said weighmaster, to said owner, lessee or agent, to make oath before some justice of the peace of the said county, in which such mine, or the opening thereof, is situated, that he will perform, or has performed, the duties of weighmaster at such mine, with honesty and fidelity, and will keep, or has kept, a true account of all the coal so weighed by him, or under his direction, and will credit and allow, or has credited and allowed, the full weight of coal in each mining car, to the party or parties who mined the same, at the rate of 2,240 pounds per ton; and it shall be the duty of every person acting as weighmaster, for the owner, lessee or agent of any of said mines, to keep a list of the number of cars, and the weight of coal in each car, and place said list in some place where the miners interested may inspect it daily; and shall make a daily report to the owner, lessee or agent of said mines, and he shall deliver a copy of the affidavit required by this section to the Mine Inspector, under the hand and seal of said justice of the peace; and it shall be the duty of said weigher to perform the several acts and matters specified in said affidavit.

207. It shall be the duty of every person or body corporate, operating a mine or mines in either of said counties, as owner, lessee or agent, to provide correct and accurate scales for weighing the coal mined therein, before the same shall be taken from the mine cars used by the miners therein.

208. Any owner, lessee, agent or operator of any coal mine in said counties of Allegany or Garrett, or any other person therein, neglecting or refusing to comply with, or violating in any manner any of the provisions of sections 201, 202, 203, 204, 205, 206, 207 and 209, shall be deemed guilty of a misdemeanor, and upon indictment and conviction thereof, may be fined for each and every said offence, a sum not less than \$10 and no more than \$500, in the discretion of the court.

209. It shall be lawful, however, notwithstanding the provisions of sections 206 and 207, for any corporation or individual engaged in mining coal in Allegany and Garrett counties, in this State, in or by a shaft, to contract with miners to dig the coal therein or therefrom by measurement; and in all cases where the wages of the miners are by contract or agreement ascertained by the cubic yard or other measurement, it shall not be obligatory upon such corporations or individuals so contracting to provide scales, or any weighmaster or weighmasters at such shaft, or to weigh any coal therein or taken therefrom; but the miners' cars used in any mine worked by a shaft, shall be measured by a sworn measurer, and the capacity of each car shall be stamped or branded thereon.

194. The period of employment of workingmen employed in and about the mines of Allegany and Garrett counties shall be ten hours per day, said hours to be computed from the time of beginning said day's labor; provided, that the time of beginning said day's labor shall be 7 o'clock A. M.; but nothing herein contained shall in any way preclude any workingman in and about said mines from working a greater number of hours should he so desire, and enter into contract with the owner or owners or managers of any of said mines, such additional hours to be computed as overtime and to be paid for.

195. Any person, body corporate, agent, manager or employer who shall violate any of the provisions of the foregoing section shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined not more than fifty dollars.

CHAPTER 133.

An Act to require all corporations incorporated under the laws of Maryland, engaged in mining coal in Allegany county to pay their employes wages due semi-monthly.

SECTION 1. Be it enacted by the General Assembly of Maryland, That all corporations incorporated under the laws of Maryland, hereafter engaged in mining and shipping coal in Allegany county, be and the same are hereby required to pay each and all their employes their wages earned in said employment semi-monthly—that is to say, all wages earned on and before the 15th of each month shall be paid not later than upon the 25th day of said month, and all wages earned from the 16th to the end of each month shall be paid not later than the 10th day of the succeeding month, unless said 25th day or 10th day of any month shall fall on Sunday or a legal

holiday, in which case the time for payment shall be extended to the next day.

SEC. 2. And be it enacted, That any such corporation wilfully refusing to make said payments of wages at the times hereinbefore specified, or wilfully withholding said wages from said employes beyond said times, shall be guilty of a misdemeanor, and upon indictment and conviction thereof, shall be fined not less than \$50 nor more than \$300, in the discretion of the Court.

SEC. 3. And be it enacted, That this Act shall take effect on or before the 5th day of April, 1896.

Approved April 4, 1896.

*Statement of Appropriation and Expenditures for Bureau of
Industrial Statistics, for the Fiscal Year Ending
February 28, 1898.*

Amount of appropriation, March 1, 1897.....	\$5,000 00	
Salary of Chief.....		\$2,500 00
Other salaries		1,535 00
Postage		141 91
Traveling expenses.. ..		82 90
Typewriting machine... ..		80 00
National Bureau Reports.....		14 90
King Bros., printing		237 43
Kurtz & Son, printing.....		22 65
R. L. Polk, directory.....		6 00
Merchants' National Bank Company, rent...		379 21
Total.....	\$5,000 00	\$5,000 00

TABLES

RELATING TO THE

COAL INDUSTRY

OF

MARYLAND.

Net increase..... 269,665

*Of this amount 9,718 tons was delivered by C. & P. R. R. to W. Va. C. & P. Ry. at Westernport Junction and went to P. R. R.

THE CUMBERLAND COAL TRADE—From 1842 to 1897 inclusive—56 Years.—Table No.

[illegible]

*Includes 140,908 tons used on the line of the Cumberland and Pennsylvania Railroad and its branches and a St. Louis, Mo., branch.

107 this amount 33,140 tons were shipped to Chesapeake and Ohio Canal via Piedmont, B. and O. R. R. to Cumberland

g	"	"	3,744	"	"	Pennsylvania
†	"	"	91	"	"	"

1 " " 2

TABLE No. 2.

Showing the Output of the Various Mining Companies in 1897, giving Increase and Decrease as Compared with 1896.

NAME OF COMPANY OR MINE.	1897.					Compared with 1896.	
	To B. & O. R. R.	Co C. & O. C.	To Pa. R. R.	Sum. & Local.	Total.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Consolidation Coal Co.....	981,781	204,713	634	78,551	1,265,682	113,866	.....
Black, Sheridan, Wilson Co.....	681,740	1,894	14,329	26,754	724,717	145,989	.....
George's Creek Coal & Iron Co.	346,288	56,500	80,255	10,345	493,388	.....	31,743
American Coal Co.....	102,687	.....	351,131	19,147	475,965	14,750	.....
Maryland Coal Co.....	17,680	.....	343,908	9,646	371,234	11,609	.....
New Central Coal Co.....	62,870	.....	140,419	2,973	206,262	17,809	.....
Borden Mining Co.....	4,246	.....	154,716	9,581	168,543	831	.....
Davis Coal & Coke Co. (Franklin Mine)..	75,235	.....	16,535	11,115	102,885	.....	5,771
Big Vein Coal Co., (Md.)..	61,804	.....	.....	.....	61,804	.....	8,501
Barton Mining Co. (Swanton Mine).....	26,854	120	.....	179	27,153	22,548	.....
Piedmont-Cumberland Coal Co.....	15,663	.....	.....	*11,289	26,950	18,682	.....
Arl. & Geo.'s Ck. Con. Coal Co. (Md.)...	7,295	.....	.....	51	7,346	.....	30,404
	2,384,146	263,227	1,104,927	179,631	3,931,929	346,084	76,419
						76,419	
						269,665	

Net increase.....

*Of this amount 9,718 tons was delivered by C. & P. R. R. to W. Va. C. & P. Ry. at Westernport Junction and went to P. R. R.

TABLE No. 3.

Official Report of the George's Creek Cumberland Coal Region for the Week Ending Saturday, February 19, 1898, and for 1897, to same date.

COMPANIES.	B. & O. & L'C.		C. & O. Can'l.		P. Sta. Line.		Total for Wk.		Year to date.	
	tons	cwt.	tons	cwt.	tons	cwt.	tons	cwt.	tons	cwt.
Borden Mining Co.....	218	19	.....	.....	2,259	07	2,478	06	17,295	05
Consolidation Coal Co.....	21,453	07	.....	.....	15	05	21,668	12	142,688	09
Black, Sheridan, Wilson Co.....	12,647	07	.....	.....	331	08	12,978	15	102,120	13
George's Creek Coal & Iron Co	9,510	10	.....	.....	1,198	01	10,708	11	70,049	08
Barton Mining Co.....	.....	.....	.....	.....	.....	.....	.....	.....	2,007	10
Atlantic & G. C. C. Co .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Piedmont-Cumberland Coal Co	599	08	.....	.....	.....	.....	599	08	5,448	04
Big Vein Coal Co.....	1,620	16	.....	.....	.....	.....	1,620	16	9,685	12
Davis C. & C. Co. (Franklin Mine)	1,831	13	.....	.....	306	03	2,137	16	15,962	17
American Coal Co.....	1,924	03	.....	.....	8,417	06	10,341	09	67,089	17
Maryland Coal Co.....	322	10	.....	.....	8,598	05	8,920	15	42,096	16
New Central Coal Co.....	1,686	13	.....	.....	2,566	18	4,253	11	29,971	01
Total for week.....	52,015	06	.....	.....	23,692	13	75,707	19	.....	.....
Previously for year.....	310,035	03	.....	.....	118,652	05	428,687	08	.....	.....
Aggregate.....	362,050	09	.....	.....	142,344	18	.....	.....	504,395	07

TABLE No. 4.

Table giving Name of Company and Number of Men Employed.

Name of Company.	No. of Men Employed.
Consolidation Coal Co.....	1,400
American Coal Co.....	406
Borden Mining Co.....	150
Maryland Coal Co.....	447
New Central Coal Co.....	187
George's Creek C. & I. Co.....	500
Union Mining Co.....	198
New York Mining Co.....	210
Barton & George's Creek V. C. Co.....	255
Potomac Coal Co.....	115
Davis Coal & Coke Co.....	119
Big Vein Coal Co....	67
Piedmont & Cumberland Coal Co.....	30
Pattison Mining Co.....	42
A. J. Merrill Co.	
Manor Big Vein Co.....	
Barton Mining Co.....	50
■ Atlantic & George's Creek Coal Co	
Total .	4,176

TABLE No. 5.

Showing Wages Paid for Mining in the George's Creek Region.

	Cents per Ton.
1856 January to May, 1862.....	30
1862 June to September.	40
1862 September to January, 1863	45
1863 January to March, 1864.....	50
1864 April to June.....	60
1864 June to September.....	75
1864 September to May, 1865.....	1 00
1865 June to May, 1866.....	75
1866 May to January, 1877.....	65
1877 January to August	50
1877 August to March, 1878	55
1878 March to October, 1879	40
1879 October to February, 1880.....	50
1880 February to March 15, 1882.....	65
Strike till August 24.	
1882 August 24 to November, 1884.....	50
1884 November to March 8, 1886.....	40
Six weeks strike for 50 cents.	
1886 April to March 1, 1887.....	40
1887 March to April 1, 1894.....	50
1894 April to May 8th.....	40
Seven weeks strike for 50 cents.	
1894 July to April 1, 1896.....	40
1896 April to present time	45

